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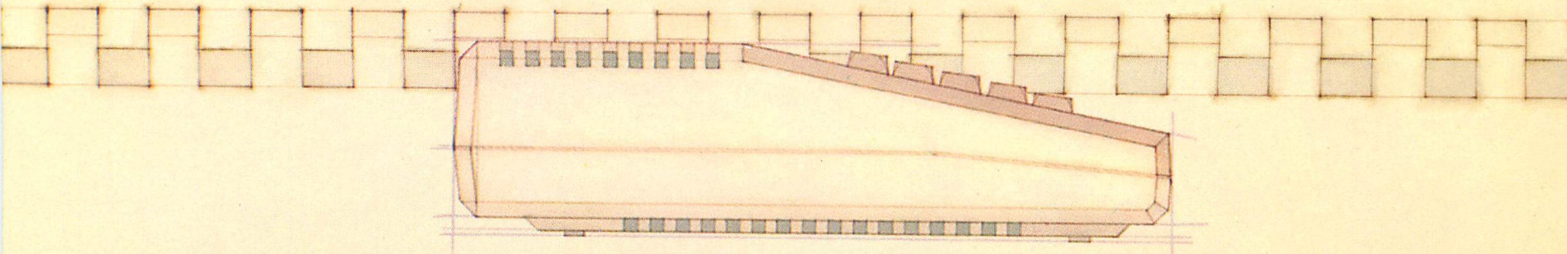
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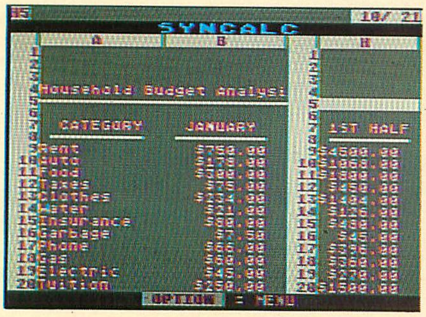
AUGUST 1984 VOLUME 3, NUMBER 4

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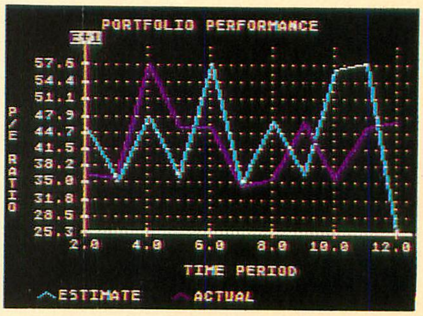




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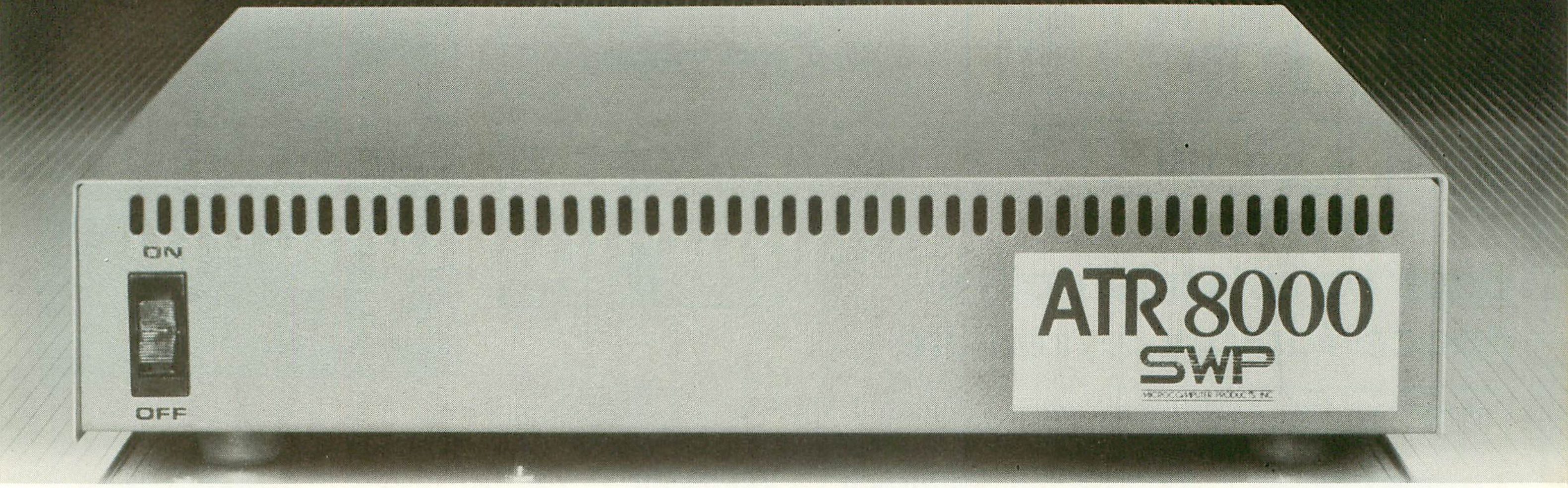
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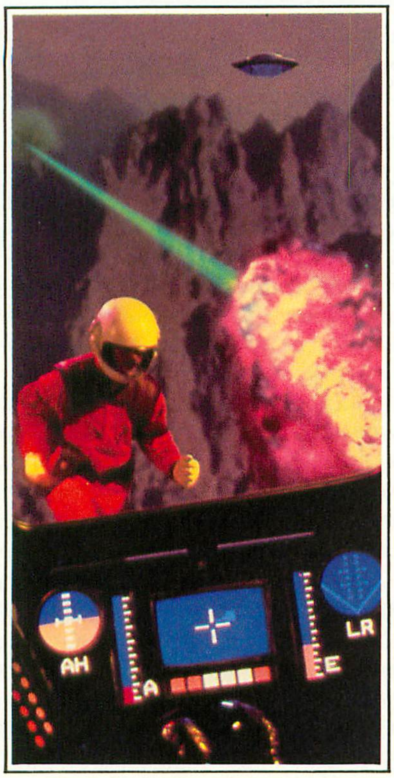
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The ATARI Resource AUGUST 1984 VOLUME 3, NUMBER 4

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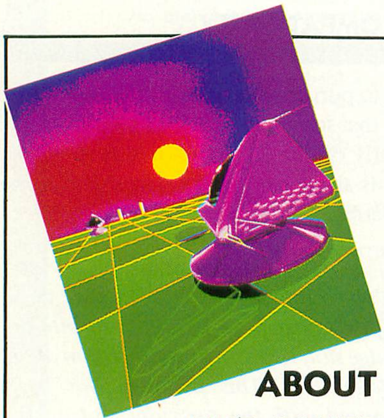
FEATURES



DEPARTMENTS



help!



ABOUT THE COVER

The image on our cover is a computer-generated representation of a Ballblazer game in progress. Lucasfilm model builders created and photographed an imaginary set. The photo was then digitized by Russell Brown, a graphic designer for Atari's International Division, using the Via Video picture processing system. After the image was digitized, Russell creatively enhanced and altered it for the cover of Antic. Next a color slide of Russell's image was scanned into the Scitex Response 350 electronic page makeup and color separation system used by Solzer and Hail of San Francisco. The Scitex system, the most advanced image processing system available and one of four in the U.S., directly color separated the image using an Eray Direct Laser Dot plotter. The laser beams make each pixel stand out with more clarity than any photographic process.

The collaboration of Lucasfilm's design and model-building team, Russell Brown at Atari, Solzer & Hail's crew and Antic Magazine's art department created a magazine cover unlike any other, and paves the way for graphic design using computers in the future.

To find out more about Via Video, Inc., call (408) 980-8009; Solzer and Hail call (415) 495-8440.

WHAT, NO CASSETTE?

In the March 1984 issue of **Antic** there was an ad for an Atari XL translator for cassettes. I am the owner of a cassette and am very upset to find out that Atari does not produce a cassette version of its translator.

Jim Van Leeuwen

According to Atari, there are currently no plans to produce a cassette version of the translator, although Atari will continue to provide copies of the Translator diskette. —ANTIC ED

LITTLE BROTHER GROWS UP

There is an error in the article "Little Brother Grows Up" (**Antic**, April 1984). On page 68, at the end of the first paragraph under the subhead "Interface Connections," there's a reference to C 183. This should be C 188. All labels on the schematics are correct.

C BASIC AT LAST!

In the June 1984 issue of **Antic**, we discussed various bugs in the version of BASIC (Revision B) built into the 600XL and 800XL. We also announced that the bug-free Revision C BASIC would be available soon for $15.

Thanks in part to efforts by the **Antic** staff, Atari has revised this policy in favor of you, the consumer. If your 600XL or 800XL is still in warranty, Atari will send you the Revision C BASIC cartridge *free*. If the warranty period on your computer has passed, there is still a $15 fee. Send your proof of purchase and your computer's serial number (or $15) to:

Atari Customer Relations
1312 Crossman Ave.
P.O. Box 61657
Sunnyvale, CA 94088

INVISIBLE MAZE

Could someone tell me—are there really invisible walls in the first maze of ESCAPE-MAZE, (**Antic**, March 1984)?

George Sypniewski
Trenton, New Jersey

Contrary to early reports, there are no invisible walls in the first level of ESCAPE-MAZE. —ANTIC ED

DISASSEMBLER DANGERS

The following errata in "6502 Disassembler" (**Antic**, March 1984) have been noted by John Mattes, the program's author:

1) Screen #30, lines 10 and 13 should read:

10 0 < IF DROP DROP I 0 LEAVE

13 0 VARIABLE POINTER

2) Screen #35, line 1 should read:

1 BEGIN CR

3) The program's Table of Address Modes was inadvertantly omitted from the published article. Any Forth users who are interested in this table should write to Antic; please enclose an S.A.S.E. and we'll be happy to send you the omitted copy.

4) Finally, the program will not run in Val-Forth, but will run in FreeForth or Atari (APX) Forth.

RISKY PARENTHESIS

The program listing for "Risky Rescue," (**Antic**, April 1984), contains several odd-shaped (due to typesetting) inverse right parenthesis characters that may be confusing to those typing it in. In lines 610, 665, and 710, the inverse right parenthesis immediately follows an asterisk (*), and in line 680, it follows a plus sign (+).

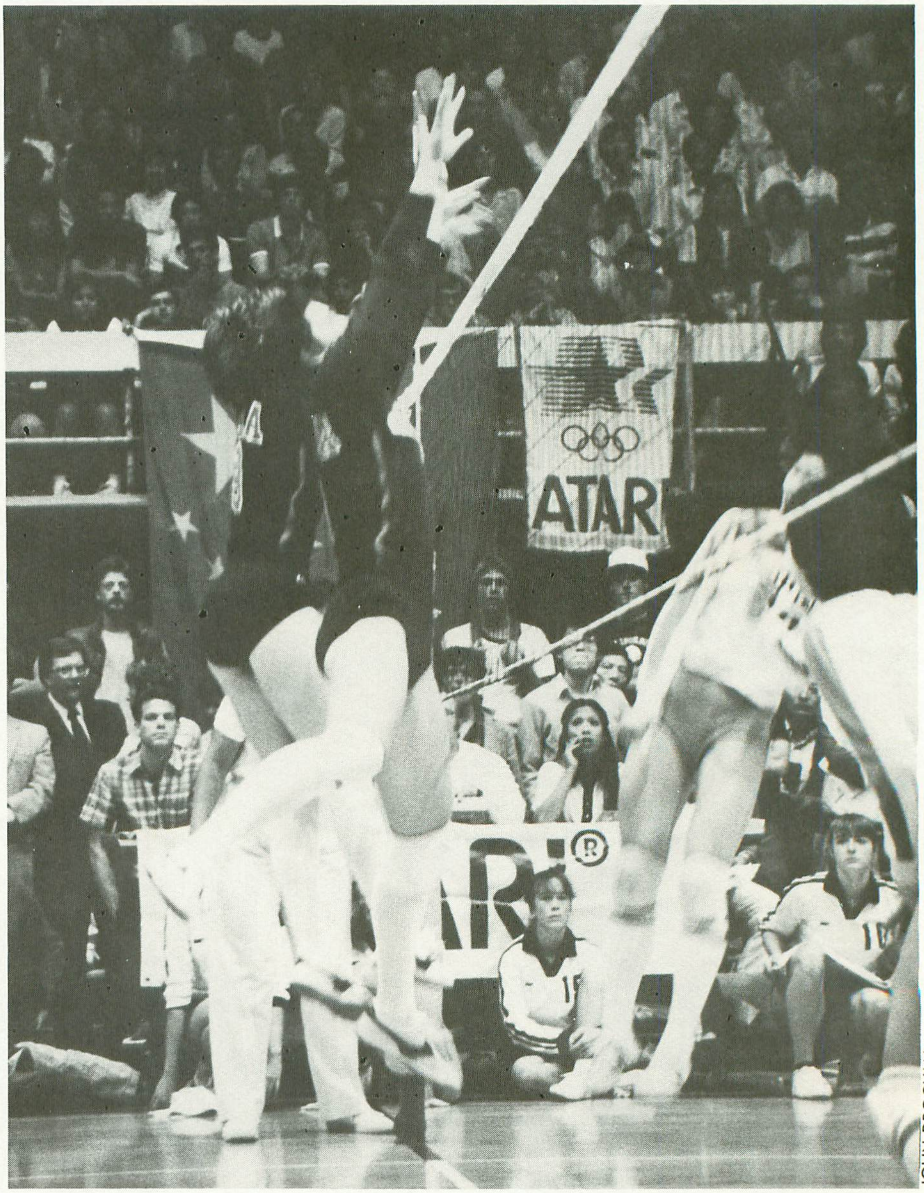
COLOR FINETUNER

There are three typographical errors in the article "Color Finetuner" (**Antic**, June 1984). On page 55, under the subhead "The Color Finetuner Routine," the second line of the fragment of assembly code labelled "INSTAL" should read: LDX #CHECK1/$100. On page 56, the last line of the first section of code (labelled "CHECK 2") should be: BNE EXIT. Also on page 56, the second line of the section of code labelled "FCOLOR" should be: LDA PCOLR0,X. None of these prevents the accompanying BASIC listing from running correctly.

WOMEN'S OLYMPIC VOLLEYBALL TEAM

Atari sponsors a gold medal effort

by DAVID BARRY



JOHN DROOYAN

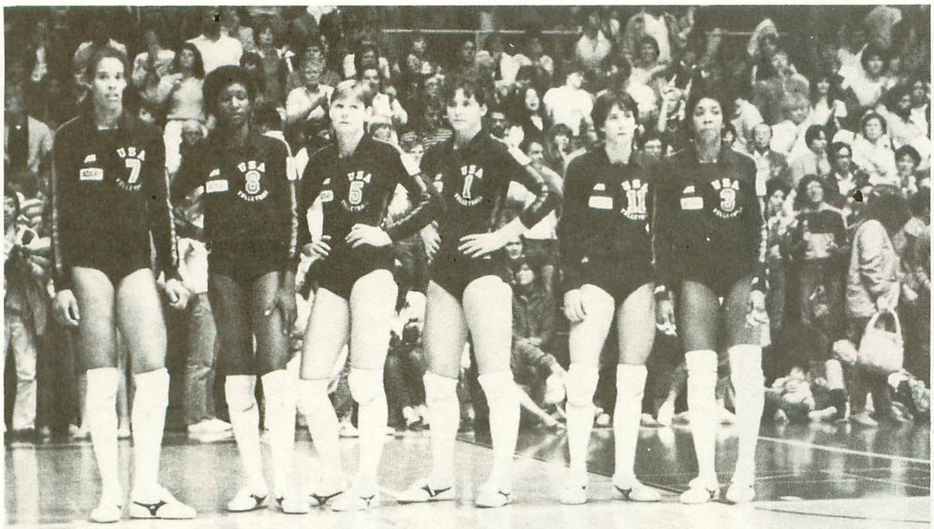
The time is fast approaching that will test the mettle of the Atari-sponsored U.S. Women's Volleyball Team. And the testing will be tough; the U.S. is up against some formidable opponents.

Eight teams have qualified for the Olympic sport of volleyball this summer in Los Angeles: The U.S., which receives an automatic slot as the host country; the U.S.S.R., the 1980 defending champion; China, the 1982 World Champion; and five other teams selected from the five continental championships in 1983: East Germany, Brazil, Japan, Peru, and Cuba.

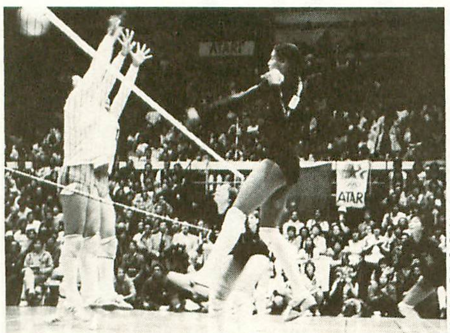
The teams will be broken into two pools, with three round-robin matches slated for each team.

World ranking now places China in the number-one spot and the U.S., number two. But to capture the gold and displace China from its throne, the U.S. must be mighty sharp. China is an awesome squad.

In April, Atari sponsored a six-city tour of the United States in which the U.S. team played China. It was the last chance for the two top teams to play before the Olympics this summer, and China was clearly the dominant force. Their team won five of the six matches, moving so quickly on defense that it was difficult for the U.S. to penetrate and score. Chinese sensation Lang Ping led their offensive force with her brilliant spiking power. At the time, however, U.S. coach, Arie Selinger, pointed out



JOHN DROOYAN



JOHN DROOYAN

that top-line American players were injured, including Rita Crockett, a 5′8″ hitter/blocker who only weeks earlier had undergone knee surgery; Debbie Green, the team's best setter who was recovering from a dislocated ankle; and Julie Vollersten, who had also undergone knee surgery.

The U.S. team was scheduled to play matches against Japan and the U.S.S.R. between April and the Olympics in July. After those matches they would spend the rest of their time at the computerized facilities in Coto de Caza for rehabilitative work and final preparation before the big one in July. (By the time you read this, we all may be privy to the fate of our team!)

ITEMS OF INTEREST

An interesting situation occurred at the University of California at Berkeley, during the last match of the China series. In the first game of the match, with the game tied 10–10, Coach Selinger halted the game, insisting that the video cameras filming the game be removed. According to Selinger, the Japanese had been doing their best to study the U.S. team (perhaps through digitization, digitized images used to analyze body movements, an old Dr. Gideon Ariel trick). But Selinger was wise to the world of computer-aided research, and nipped the plot in the bud. The cameras were removed before the game proceeded. Selinger noted that once before, "Japan actually had a videotape in their hands the second day after we played."

. . . Coach Selinger was very impressed with the turnout at Harmon Gym on April 24th. One of Selinger's expressed aims when he assumed coaching responsibilities in 1975, aside from capturing the gold medal, was to "promote volleyball in this country and bring it to a higher level of skill." Nine years later Selinger was quite impressed with his efforts, as spectators in the jam-packed rafters of the Harmon Gym loudly supported the U.S. Women's Volleyball Team. Said Selinger, "This is the first time in the history of the team that there was a pre-game sellout. I wouldn't mind if we had another game here. I'd love to have another crowd like that."

ATARI ACTIVITIES

As sponsor of that six-city tour in April, Atari was very much in evidence. At Harmon Gym in Berkeley, Atari arcade games were set up beneath large banners proclaiming Atari the official home computer of the Olympics.

. . . As part of its further involvement in the Olympic activities, Atari will be sponsoring two kilometers of the approximately 15,000 kilometer U.S. torch run. As is the Olympic custom, the torch must be carried from Greece to the site of the new Olympics, this year in Los Angeles. The Los Angeles Organizing Committee this year has sold portions of the run to sponsorships and other organizations that can muster the $3,000 commitment.

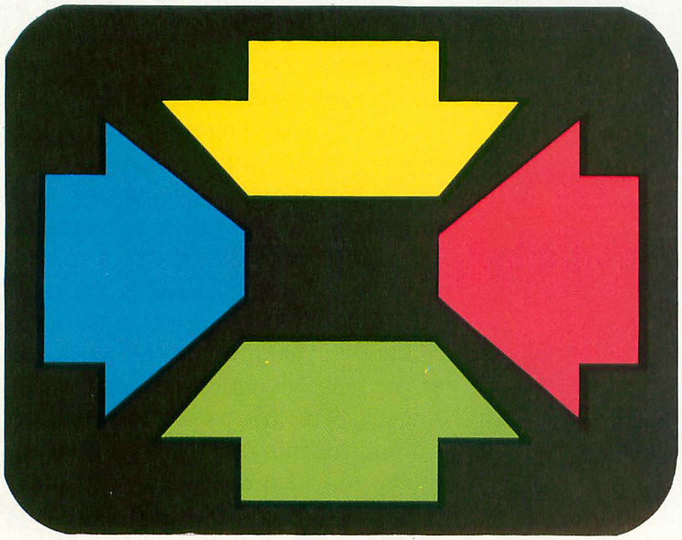
The U.S. leg of the relay begins in New York City on May 8, and ends 82 days later at the Los Angeles Memorial Coliseum after passing through all 50 states and the District of Columbia.

Atari chose two employees at their April 14th "Carry the Torch!" Fun Run to carry the torch for their portion of the run. Festivities are planned for the segment of the run which will pass through the San Francisco Bay Area sometime in July.

. . . Atari has also helped compile a 3 minute 7 second video clip of the outstanding development of the U.S. Women's Volleyball Team. The clip shows the team at their facilities in Coto de Caza, and chronicles their dramatic rise from unranked status to their current number-two ranking.

The clip is being distributed nationally to major networks, so look for the Atari video clip on the tube.

This is the final article in our Olympic coverage. Part I appeared in the February issue, Part II appeared in the March issue, and Part III appeared in the April anniversary issue. —ANTIC ED



RECALL

A memory game that's hard to forget

by DAVID WAX

Want to improve your memory? Type this program in, plug in your joystick, turn up the sound and prepare to be challenged.

In the game RECALL, four colored arrows flash and beep. Your object is to duplicate the sequence. If you get it right, the computer adds an additional step to the same sequence. If you forget the order of the flashes, it's back to the beginning. You can control the duration and number of each flashing sequence.

When the program starts, you'll see "2 ROUNDS" on the screen. Here you select the length of the final sequence of lights and sounds. Push the joystick up for more rounds, and down for fewer. If you push down when "2 ROUNDS" appears, the count wraps around to the maximum possible total of 99. Push the fire button to select the number of rounds you wish to play. Next, select the speed at which the arrows flash. Push the stick up or down to move the indicator. Press the joystick button to indicate your choice.

SYNOPSIS

This colorful game tests your ability to remember a sequence of colors and sounds, and is suitable for all ages. The program requires Atari BASIC and a minimum of 16K RAM. RECALL runs on all Atari computers.

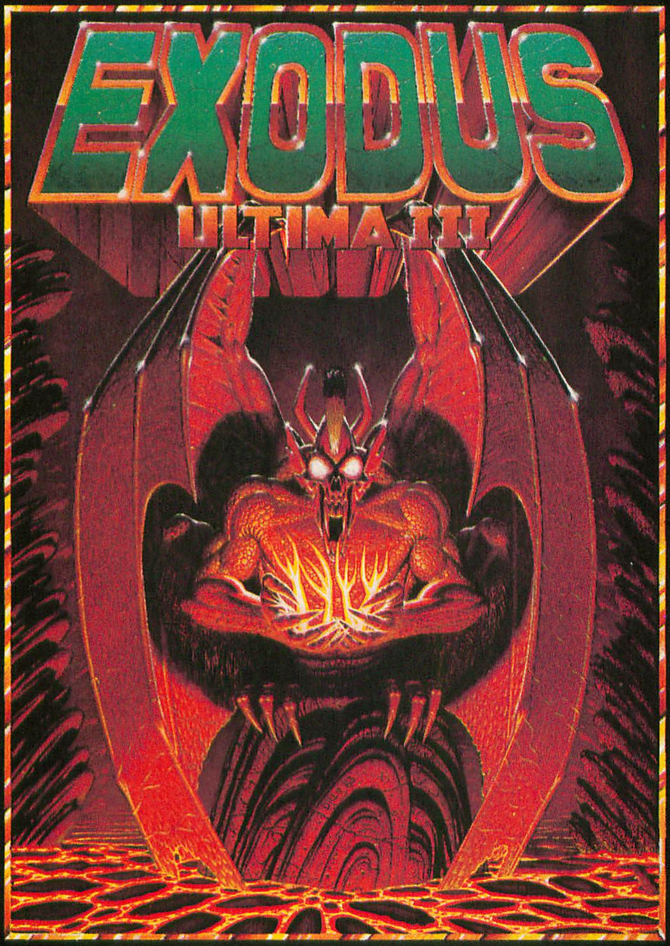
The game starts. Four large, colored arrows in a circle blink in a random sequence. These sequences are different for each game. Using your joystick, try to copy the order in which the arrows flash. Suppose you choose "2 ROUNDS." The top arrow blinks and a tone sounds; you push the joystick upward and press the button. Then the program repeats the blinking top arrow and adds an additional blinking arrow to the sequence. In response, you move the joystick up and then down. That's 2 rounds.

The tone that accompanies each movement helps you remember the sequence; to make things more difficult, try playing with no sound!

Adults and children can play and enjoy this simple, yet challenging memory-testing game. It's easy to get the hang of it, and, once you start, it's hard to stop! Try it—but remember to save the RECALL listing to disk or cassette before running the program.

continued on page 14

"A LIVING TAPESTRY . . ."



"The world of Ultima III can only be compared to a living tapestry — complex and beautiful . . . This is the best fantasy game in computing. Indeed, it is one of the best fantasy worlds in which to live. Lord British is a veritable JRR Tolkien of the keyboard." — Popular Mechanics

"Exodus: Ultima III, with a superior plot to match its superior gaming system, is a great game. It upgrades the market; in several ways it sets new standards for fantasy gaming state of the art." — Softline

"Exodus: Ultima III is Lord British's magnum opus — so far. It's fun and exciting to play and constantly intriguing. And the ending is marvelously unexpected and not a bit disappointing — except that it is the ending, and as with a good book, you'll probably wish there were more." — Softalk

Available on: Apple, Atari, Com64, IBM

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RECALL continued from page 12

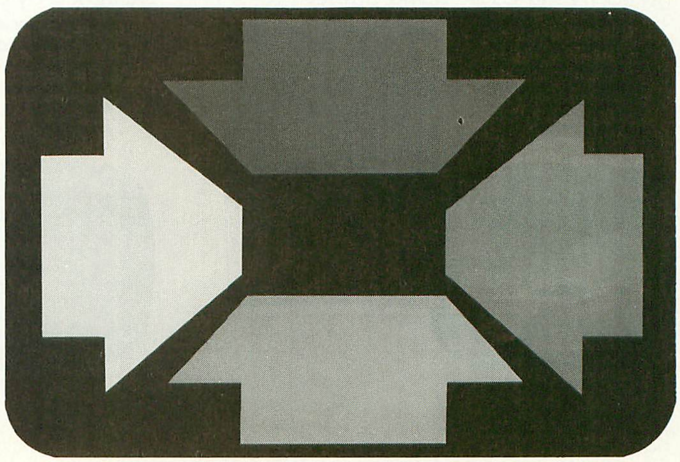
```
10 REM RECALL
12 REM BY ROBERT ADLER AND DAVID WAX
14 REM ANTIC MAGAZINE
20 DIM PIC$(50)
40 GRAPHICS 18:DL=PEEK(560)+PEEK(561)*
256+4
45 POKE 16,64:POKE 53774,64:POKE 752,1
:POKE 710,0:POKE 708,0
47 POKE DL+5,7:POKE 87,2
50 POSITION 6,4:? #6;"RECALL"
55 POKE DL+8,6:POKE DL+9,6:POKE 87,1:P
OSITION 2,7:? #6;"BY DAVID WAX &":POSI
TION 3,8:? #6;"ROBERT ADLER"
60 FOR I=0 TO 15:SOUND 0,255,10,I:POKE
 710,I:FOR T=1 TO 50:NEXT T:NEXT I
70 FOR I=0 TO 15:SOUND 0,255,10,I:POKE
 708,I:FOR T=1 TO 50:NEXT T:NEXT I
75 SOUND 0,0,0,0:FOR I=1 TO 600:NEXT I
80 FOR I=15 TO 1 STEP -1:SOUND 0,255,1
0,I:POKE 710,I:FOR T=1 TO 30:NEXT T:NE
XT I
90 FOR I=15 TO 1 STEP -1:SOUND 0,255,1
0,I:POKE 708,I:FOR T=1 TO 30:NEXT T:NE
XT I
95 SOUND 0,0,0,0:FOR I=1 TO 300:NEXT I
100 GOTO 10000
500 GRAPHICS 18:POKE 756,BASE:POKE 16,
64:POKE 53774,64:? #6:? #6
510 ? #6;"     QQQQQQQ"
512 ? #6;"    VYQQQQQQQXz"
514 ? #6;"   QQVYQQQQQXzqq"
516 ? #6;"   QQQV     zqqq"
517 ? #6;"   QQQQ     qqqq"
518 ? #6;"   QQQX     yqqq"
520 ? #6;"   QQXzqqqqqvyqq"
522 ? #6;"    Xzqqqqqqqvy"
524 ? #6;"     qqqqqqq":N=1
525 SETCOLOR 0,2,10:SETCOLOR 1,12,10:S
ETCOLOR 2,9,5:SETCOLOR 3,4,5
600 FOR TI=1 TO NUM:BL=INT(RND(0)*4)+1
:RE(TI)=BL:NEXT TI
602 FOR TIM=1 TO 230:NEXT TIM:NU=NU+1:
FOR TI=1 TO NU:IF NU=NUM THEN 4000
610 FOR DELAY=1 TO SP:NEXT DELAY:ON RE
(TI) GOTO 620,630,640,650
620 SETCOLOR 0,0,0:SOUND 0,100,10,10:F
OR I=1 TO 175:NEXT I:SOUND 0,0,0,0:SET
COLOR 0,2,10:NEXT TI:GOTO 660
630 SETCOLOR 3,0,0:SOUND 0,250,10,10:F
OR I=1 TO 175:NEXT I:SOUND 0,0,0,0:SET
COLOR 3,4,5:NEXT TI:GOTO 660
640 SETCOLOR 1,0,0:SOUND 0,200,10,10:F
OR I=1 TO 175:NEXT I:SOUND 0,0,0,0:SET
COLOR 1,12,10:NEXT TI:GOTO 660
650 SETCOLOR 2,0,0:SOUND 0,150,10,10:F
OR I=1 TO 175:NEXT I:SOUND 0,0,0,0:SET
COLOR 2,9,5:NEXT TI:GOTO 660
660 N=1
2000 IF N<>NU+1 THEN ST=STICK(0):ON ST
 GOTO 0,0,0,0,2000,2000,2010,0,2000,20
00,2020,0,2030,2040,2000
2005 GOTO 602
2010 POSITION 9,6:SETCOLOR 3,0,0:SOUND
 0,250,10,10:FOR I=1 TO 30:NEXT I
2011 SETCOLOR 3,4,5:IF RE(N)<>2 THEN 5
000
2012 GOTO 3000
2020 SETCOLOR 2,0,0:SOUND 0,150,10,10:
FOR I=1 TO 30:NEXT I
2021 SETCOLOR 2,9,5:IF RE(N)<>4 THEN 5
000
2022 GOTO 3000
2030 SETCOLOR 1,0,0:SOUND 0,200,10,10:
FOR I=1 TO 30:NEXT I
2031 SETCOLOR 1,12,10:IF RE(N)<>3 THEN
 5000
2032 GOTO 3000
2040 SETCOLOR 0,0,0:SOUND 0,100,10,10:
FOR I=1 TO 30:NEXT I
2041 SETCOLOR 0,2,10:IF RE(N)<>1 THEN
5000
2042 GOTO 3000
3000 IF STICK(0)=15 THEN N=N+1:SOUND 0
,0,0,0:GOTO 2000
3001 GOTO 3000
4000 REM CORRECT
4010 GRAPHICS 18:POKE 16,64:POKE 53774
,64:POSITION 5,5:? #6;"VERY GOOD!"
4020 FOR T=1 TO 16:READ A,B,C:SOUND 0,
A,10,5:SOUND 1,B,10,5:SOUND 2,C,10,5:F
OR I=1 TO 35:NEXT I:NEXT T
4030 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
 2,0,0,0
4040 GOTO 10000
4050 DATA 102,204,0,68,0,0,68,0,0,50,8
1,136,45,76,0,40,50,204,45,68,0,50,81,
136,45,68,0,40,50,204,50,81,204
4060 DATA 0,0,0,50,81,136,50,81,136,50
,81,136,50,81,136
5000 REM INCORRECT
5010 GRAPHICS 18:POKE 16,64:POKE 53774
,64:POSITION 6,5:? #6;"SORRY"
5020 SOUND 0,255,10,6:SOUND 1,250,10,6
:FOR I=1 TO 350:NEXT I:SOUND 0,0,0,0:S
OUND 1,0,0,0
10000 CLR :RESTORE :POKE 559,0:DIM RE(
99),QQ$(1):GOSUB 30000
10005 GRAPHICS 18:POKE 16,64:POKE 5377
4,64:POSITION 7,6:? #6;"ROUNDS":NUM=2
10010 IF STICK(0)=14 THEN NUM=NUM+1
10020 IF STICK(0)=13 THEN NUM=NUM-1
```

```
10030 IF NUM=1 THEN NUM=99
10032 IF NUM=100 THEN NUM=2
10035 POSITION 4,6:? #6;NUM;" "
10040 IF STRIG(0)=0 THEN SOUND 0,100,1
0,10:FOR I=1 TO 10:NEXT I:SOUND 0,0,0,
0:FOR I=1 TO 40:NEXT I:GOTO 10050
10042 FOR I=1 TO 60:NEXT I
10045 GOTO 10010
10050 NUM=NUM+1:SP=0:GRAPHICS 17:POKE
16,64:POKE 53774,64:? #6:? #6;"       H
OW FAST":? #6:VER=6
10060 ? #6:? #6:? #6:? #6;"  VERY FAST
":? #6:? #6;"  FAST":? #6:? #6;"  MEDI
UM":? #6:? #6;"  SLOW":? #6
10061 ? #6;"  VERY SLOW":POSITION 0,VE
R:? #6;"[illegible]"
10070 FOR I=1 TO 10:NEXT I:IF STICK(0)
=14 THEN 10080
10071 IF STRIG(0)=0 THEN SOUND 0,100,1
0,10:FOR I=1 TO 10:NEXT I:SOUND 0,0,0,
0:GOTO 10100
10075 IF STICK(0)=13 THEN 10090
10076 GOTO 10070
10080 IF VER=6 THEN 10070
10081 POSITION 0,VER:? #6;" ":VER=VER-
2:POSITION 0,VER:? #6;"[illegible]":SP=SP-30:GOT
O 10070
10090 IF VER=14 THEN 10070
10091 POSITION 0,VER:? #6;" ":VER=VER+
2:POSITION 0,VER:? #6;"[illegible]":SP=SP+30:GOT
O 10070
10100 GOTO 500
30000 VT=PEEK(134)+256*PEEK(135):AT=PE
EK(140)+256*PEEK(141):B=PEEK(106):IF B
/2=INT(B/2) THEN POKE 106,B-5
30010 BASE=PEEK(106)+1:OFFSET=256*BASE
-AT:V3=INT(OFFSET/256):V2=OFFSET-256*V
3
30020 POKE VT+2,V2:POKE VT+3,V3:POKE V
T+4,0:POKE VT+5,4:POKE VT+6,0:POKE VT+
7,4
30100 QQ$="[illegible]"
30200 QQ$(LEN(QQ$)+1)="[illegible]"
30300 QQ$(LEN(QQ$)+1)="[illegible]"
30400 QQ$(LEN(QQ$)+1)="[illegible]"
30500 QQ$(LEN(QQ$)+1)="[illegible]"
30600 QQ$(LEN(QQ$)+1)="[illegible]"
30700 QQ$(LEN(QQ$)+1)="[illegible]"
30800 QQ$(LEN(QQ$)+1)="[illegible]"
30900 QQ$(LEN(QQ$)+1)="[illegible]"
31000 QQ$(LEN(QQ$)+1)="[illegible]"
31100 QQ$(LEN(QQ$)+1)="[illegible]"
31200 QQ$(LEN(QQ$)+1)="[illegible]"
31300 GRAPHICS 0:POKE 756,BASE:POKE 55
9,34:RETURN
```

TYPO TABLE

Variable checksum = 481084

Line num range			Code	Length
10	–	60	PP	555
70	–	500	VV	509
510	–	602	GK	541
610	–	640	OE	543
650	–	2011	MA	502
2012	–	3000	IN	551
3001	–	4060	QW	532
5000	–	10020	TY	500
10030	–	10060	OA	586
10061	–	10091	EZ	518
10100	–	30300	IM	602
30400	–	30800	KO	570
30900	–	31300	KC	502



WHAT WOULD YOU DO IF YOU



You're headed deep into the jungle. The treasure's there. You know it. But between you and a king's ransom in gold lie tarpits and quicksand and creatures that do not like visitors. Stumbling, running, dodging, you must push on. Past scorpions, logs and crocodiles. Toward your goal. And the only way to get there is through a vast...unknown. The gold is appealing . . . but the chance for adventure, that's the real reason to go. Designed by David Crane.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600



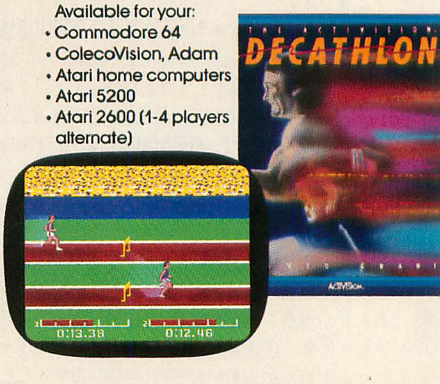
As you suit up you see the webbed forcefield surrounding your planet. Holding it. Trapped with no escape. No hope. Except you: The Beamrider. The freedom of millions depends on you. Alone you speed along the grid of beams that strangle your planet. Alone you must destroy it sector by sector. Your skill and your reflexes alone will determine the future of your people. Take their future in your hands. Designed by Dave Rolfe.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600



You made it. The Olympics. You hear languages you've never heard. And the universal roar of the crowd. You will run. Hurl. Vault. Jump. Ten grueling events. One chance. You will push yourself this time. Further than ever. Harder than ever. But then . . . so will everyone. The starting gun sounds. A blur of adrenaline. The competition increases, now two can compete on screen at the same time. Let the games begin. Designed by David Crane.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600 (1-4 players alternate)



LET'S PLAY PASSWORD

Enter the world of password-protected BBS's

by SUZI SUBECK

Telecommunications circuits are growing busier by the minute, as more and more Atari home computerists communicate via the telephone lines. Inexpensive hardware and software, combined with recent newspaper headlines, have been primarily responsible for this increase in the number of Atari bulletin board users.

The extensive media coverage of the Minneapolis, Minnesota,-based 414's (the high school students who broke into a number of computer systems using home computers and modems) has resulted in a great deal of curiosity about home telecommunications and has boosted the sale of modems. The development of direct-connect modems, such as the Microbits **MPP-1000C** (and its Smart Terminal cartridge), has significantly reduced the cost of home telecommunications by eliminating the need for the costly Atari 850 interface. The resulting influx of new callers is a welcome addition to the world of Atari telecommunications, and it has produced at least one interesting side effect.

Up until a few months ago, more than fifty percent of all Atari bulletin board systems (BBS's) were run on AMIS software. AMIS is a user-friendly, public domain bulletin board program designed for Atari computers. Current surveys indicate, however, that more complicated, less user-friendly, password-oriented BBS programs are becoming popular. The large number of new callers is the main reason for this changeover to password-protected BBS's.

There are a number of good reasons for a BBS that offers password protection. Unfortunately, there is one grave disadvantage to such a system: Most password systems are extremely intimidating to callers who are not familiar with BBS's. New callers are confused by password prompts, such as "System ID" or "Enter your password," and are unsure if such systems are free of charge, offer public domain software, and are open to all callers. New callers also are unfamiliar with the process of obtaining a password and of getting past the original password prompt.

FOREM AND CARNIVAL

The two most popular Atari bulletin board programs that offer password protection are FOREM and CARNIVAL. Both of these systems allow callers to log-on without a password by responding with "GUEST" to the initial BBS prompt. Many BBS options are denied to callers who do not have valid passwords. Nonetheless, it's generally worth logging onto a system as a "GUEST" to learn how to obtain a password to the system, whether or not there's a charge for use of the board and if there are any other applicable restrictions or considerations.

Most Atari BBS's are free, and obtaining passwords for them is easy. In fact, most FOREM and CARNIVAL boards use an identical on-line "password application." This includes the caller's name, city, state and choice of a system I.D. (On CARNIVAL boards, this password is limited to a four-character word or a four-digit number.) Write down your password and keep it near your telephone—it is always the first thing you'll be asked for when you sign on to the system. Use the same password on all bulletin boards; this will avoid unnecessary confusion.

Some system operators (or sysops) will call you on your voice phone to validate your password; others will simply add it to their system. In either case, the validation process usually takes less than 24 hours.

ADVANTAGES OF PASSWORD-PROTECTION

There are several advantages to using (or running) a BBS that offers password protection, because the expanded capabilities of such BBS software are beneficial to sysops as well as callers.

For instance, both FOREM and CARNIVAL let the sysop place a maximum time limit on all calls. This allows more callers to access the system, and gives new callers an opportunity to learn. In addition, any board benefits from increased input, because it means that there will be more information for all users to share.

Because each BBS's password file must be updated regularly, sysops must spend some additional time maintaining password-protected systems. How-

ever, one of the advantages of FOREM and CARNIVAL is that they include a "remote sysop status" option. This option allows the sysop to engage the services of a friend or associate as an assistant sysop, who can help with regular BBS maintenance from a remote location (a location removed from the BBS itself).

Another advantage of password-protected BBS's is that they give sysops the ability to refuse access to abusive callers—callers who post distasteful messages on the board, for instance. Most public domain systems do not allow X-rated or off-color messages. The instant log-on/log-off technique used by password-protected boards helps the operator keep track of what is posted on the system.

LIMITED-ACCESS MESSAGE AREAS

Both FOREM and CARNIVAL support multiple message area sub-systems. This allows a sysop to include limited-access message areas on the system. These limited-access areas are designed for private communications, and are controlled by a special password file.

Multiple message areas allow a BBS to be divided into special interest areas, such as business and industry, adventure games or current events. Some boards include an on-line story area in which callers add text to a progressive group writing project. Dungeons and Dragons is another popular topic for a special interest area. It's also possible to run a BBS quiz that lists questions in one area of the board and posts answers in a private message area.

E-MAIL

The greatest advantage to a password-protected system is the ability to post and retrieve electronic mail, or "E-Mail." Through the use of passwords, system users can leave private messages that can only be accessed by the person to whom they are addressed. After you log-on to a board that offers E-Mail, the BBS asks if you want to "Check mail?" If you answer yes, a list of the message numbers addressed to you will be listed on the screen. E-mail makes message retrieval fast, easy and private.

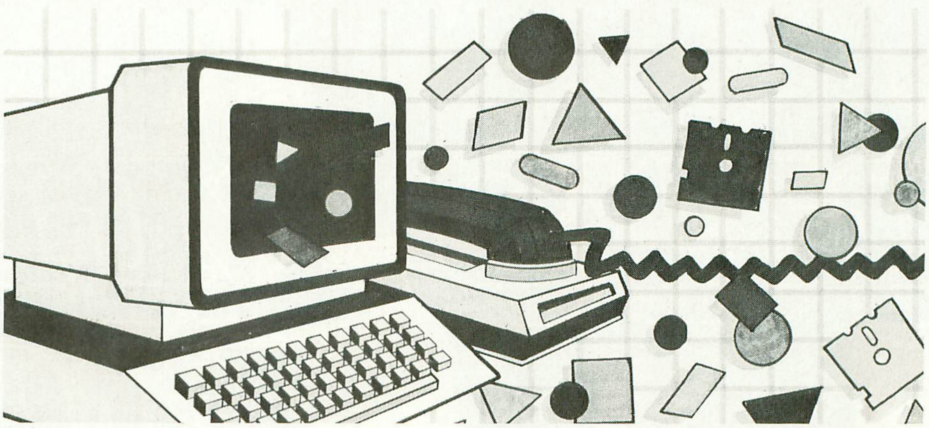
ACCESS TO DATABASES

FOREM and CARNIVAL also makes provisions for the use of multiple databases. FOREM supports 25 different levels of user security—enough for 25 separate data bases. CARNIVAL provides nine levels.

At the sysop's discretion, a caller's password may be assigned to more than one security level. For instance, your password could give you access to both a specific message base and a specific database. Multiple databases can be structured in a number of ways; however, most sysops do not use all of the available security levels because of hardware or disk space limitations.

The sysop can assign security levels based on need and use. In addition, sysops can stratify the various levels of the database by special interest. For example, one level could be reserved for educational uploads and downloads, one for utilities, and so on.

The flexibility of the FOREM and CARNIVAL BBS software is a boon to any BBS. FOREM is more structured, but overall both programs are quite useful, and, once mastered, are just as accessible to a new caller as AMIS.



BBS UPDATE

The following updates should be added to the list that appeared last month in "Call Me Modem" (**Antic**, p. 16, July 1984). Sysops should send updates regarding their boards and boards in their areas to Suzi Subeck, c/o **Antic**, 524 Second St., San Francisco, CA 94107.

In Illinois:

Tabernacle Education and Religion BBS
24-hour operation—no password required
(312) 389-2307

Courtyard
24-hour operation—no password
(312) 690-0909

Lochleven
24-hour operation—no password
(312) 892-0417

River Styx
24-hour operation—password required
(312) 432-5882

Satellite
Evening hours only—password required
(312) 759-6297

Sherwood Forest
DOWN for good
(312) 945-0377

In Indiana:

Alien II
Evening hours—no password
(219) 796-7373

In Texas:

School House
Evening hours after 10:00 pm—password required
(817) 281-2406



IT'S MERE HORS

Atari goes

SYNOPSIS

This program handicaps race horses, using information taken from the Daily Racing Form. *Users of HORSPLAY must be familiar with the terminology of the track, and should have a lively interest in handicapping. The program runs on the XL computers, but will not run on a 16K machine unless lines 100–257 are deleted. These lines create a fancy title screen which is not needed to run the program. Owners of 16K machines can type in and run these lines separately if they want to see the title screen.*



PLAY

to the races!

by DAVE ELWOOD

HORSPLAY is a program that answers several needs. First, it offers a solution for horse racing fans who want to find a system that will help them beat the odds at the race track. Second, it exemplifies the kind of practical, down-to-earth application that personal computers are designed to handle. Feel free to incorporate the techniques used in HORSPLAY into your own programs. (By the way, **Antic** is always interested in hearing about creative uses of your computers. We actively seek innovative programs which encourage the use of Atari computers. —ANTIC ED) Now, let's go off to the races!

It's hard to beat the odds. Some very good handicappers have tried, only to find that their selection has also become the public favorite. I'm not against betting the public choice, providing that there's a chance for a reasonable payoff. But how do you decide what's "reasonable?" In fact, how do you determine if any of your picks will offer a reasonable payoff? Even a "long shot" may not be enough of a long shot to be worth a bet.

Let's carry this line of reasoning further. What if we determine that a horse is going to pay more than it should? This is called an "overlay," and represents the best possible betting situation. If we can determine ahead of time what the odds on our choice "should" be, we'll be much better armed for our next trip to the track.

HORSPLAY helps us to do just that. It's based on a study of over 1000 races in which certain factors were determined to have had an impact on a horse's chances of winning. The percentages gained from this study were incorporated into the program, and are combined to predict a horse's probable chances of winning a given race. The resulting figure is then converted into recognizable odds that you can compare with the odds given at the track.

When you're handicapping a race, HORSPLAY prompts you for answers that you can easily obtain from the *Daily Racing Form*. If you wish, you can save the information on each race to disk and then recall the information later to incorporate changes such as morning scratches. The program will recalculate the odds for you, and give you a printout to boot. At that point, the computer bows out. Any betting or risk-taking that follow are on your shoulders.

Dave Elwood is a design engineering specialist who has been programming in BASIC and machine language as a hobby for two years. His favorite programming topics are related to gambling.

```
100 REM HORSEPLAY
102 REM BY DAVE ELWOOD
104 REM ANTIC MAGAZINE
110 REM MAIN TITLE FOR "HORSPLAY"
113 GRAPHICS 0:? "Wait....":POKE 82,0
116 DIM SET$(32+424)
119 CHBASE=(PEEK(106)-8)*256
122 REM SET$=NEW CHARACTER SET
125 FOR Z=1 TO 32:SET$(Z)="♥":NEXT Z
128 SET$(33)="♥rrrrrrr♥◀◀◀rrr♥◀◀◀rrrr
♥◀◀◀ppp◀♥◀◀◀pppp♥◀◀◀rrrr♥pppppp♥◀◀◀rr
rr♥rrrrrrr♥▶@FONGO♥▶♥→♣♣♣ "
131 SET$(121)="♥▶♥x◢◢◢◀♥◀▌b r b r r♥♥♥♥♥
▶♥▶♥♥♥♥♥ ✚♥♥♥♥♥r◀◀◀rrr♥rrrr◀◀◀♥r◀◀◀t
vv♥◀▌▌▌◀◀◀♥||pp◀◀◀♥r◀◀◀ppp♥"
134 SET$(209)="pppp◀◀◀♥r◀◀◀rrr♥rr◀◀▪▪▪
♥F@C\PPPP@♥♥♥♥♥♥♥♥▌▶♥♥♥♥♥♥b▌B:◣◣◣◣
♥♥♥♥▶♥▶♥♥▶♥▶♥♥♥♥PPPP\C@F"
```

continued on next page

```
137 SET$(297)="♥♥♥♥♥♥♥@♥♥♥♥♥♥♥▐▌▙▙▙▙:▐▌
b→♥╲♥♥♥♥♥ONGOF@▶♥ ♣♣→♥▶♥▟▟▟▟x♥▶♥rbrrb
▐▌♥♥♥♥♥♥♥@♣♥♥♥♥▗→▶?♥╲▗→/w▶▶"
140 SET$(385)="♥Xt▶▶▶▶▶♥♥♥♥x▐▐▁▶▕♥♥♥♥♥
♥???→▗╲╲▖▶▶▶▶→▘♥♣▐xxp▐↑▟/▐▐♥♥♥♥♥p▟▐♥@
@@♥▟▟8♥♥♥♥♥"
143 REM INSTALL NEW CHARACTER SET
146 FOR BYTE=1 TO 456:POKE CHBASE+BYTE
-1,ASC(SET$(BYTE,BYTE)):NEXT BYTE
149 REM POKE IN DLI ROUTINE
152 FOR I=1664 TO 1699:READ CODE:POKE
I,CODE:NEXT I
155 DATA 72,169,224,141,9,212,169,146,
141,0,2,169,6,141,1,2,104,64
158 DATA 72,169,152,141,9,212,169,128,
141,0,2,169,6,141,1,2,104,64
161 REM POKE IN NEW DISPLAY LIST
164 TEMP=PEEK(559):POKE 559,0
167 POKE 560,0:POKE 561,6
170 DL=1536
173 FOR BYTE=0 TO 3:READ INST
176 POKE DL+BYTE,INST:NEXT BYTE
179 POKE DL+4,PEEK(88):POKE DL+5,PEEK(
89)
182 FOR BYTE=6 TO 20:READ INST
185 POKE DL+BYTE,INST:NEXT BYTE
188 POKE DL+21,PEEK(560):POKE DL+22,PE
EK(561)
191 DATA 112,112,112,71,7,7,7,7,135,6,
6,6,6,6,134,7,7,7,65
194 ? CHR$(125)
197 POKE 756,PEEK(106)-8
200 POKE 512,128:POKE 513,6:POKE 54286
,192
206 POKE 708,198:POKE 709,48:POKE 712,
244:POKE 559,TEMP
212 POSITION 20,0:? #6;"   -.CCCCCCCC
/01"
215 POSITION 0,1:? #6;"   =>▐▐╱╲▟▐▙▐▐?
@A"
218 POSITION 20,1:? #6;"   DE▐▐▐▐▐▐▐▐↑
FGA"
221 POSITION 0,2:? #6;"   IJBBBBBBBBK
LA"
224 POSITION 20,2:? #6;"   H2222222222
223"
227 POSITION 3,3:? "by dave elwood"
230 ? " *PREDICTING ODDS*        press s
tart"
233 FOR X=1 TO 15 STEP 7
236 POSITION X,6:? #6;"mnopq"
239 POSITION X+20,6:? #6;"rstu"
242 POSITION X,7:? #6;" vwx"
245 NEXT X
248 POKE 711,255:FOR DLY=1 TO 50:NEXT
DLY
251 IF PEEK(53279)=6 THEN POKE 82,2:GO
TO 263
254 POKE 711,244:FOR DLY=1 TO 50:NEXT
DLY
257 GOTO 248
260 REM *** Main Program Here **
263 OPEN #1,12,0,"E:":OPEN #2,4,0,"K:"
266 DIM BLANK$(320):BLANK$=" ":BLANK$(
320)=BLANK$:BLANK$(2)=BLANK$
269 DIM TRK$(15),DAT$(15),ANS$(1),TYPE
$(1),GRASS$(1),H$(15),ODDS$(4),FILES$(20
)
272 DIM A$(120),TEMP$(10),BL$(10),DAY$
(9),H(12),ES(12),WT(12),RACE$(2),SORT(
12)
275 GRAPHICS 0
278 DL=PEEK(560)+PEEK(561)*256
281 REM ***DLI for Color change***
284 FOR I=1536 TO 1546
287 READ X:POKE I,X:NEXT I
290 DATA 72,169,50,141,10,212,141,24,2
08,104,64
293 POKE DL+19,130
296 POKE 512,0:POKE 513,6:POKE 54286,1
92
299 POKE 712,48:POKE 710,52
302 REM ***Modify DL for Title***
305 POKE DL+3,71:POKE DL+6,0:POKE DL+7
,6
308 ? CHR$(125):POSITION 6,0
311 TRAP 308:REM Trap for nonnumeric i
nput
314 ? "HORSPLAY"
317 IF N=0 THEN 329
320 ? TRK$;"  ";DAT$;"          RACE ";
RACE$
323 ? "The Field:":?
326 GOSUB 770
329 POSITION 14,13:? "MAIN MENU"
332 ? :? "1 HDCP A NEW RACE    5 PRINT
THIS RACE"
335 ? "2 GET A SAVED RACE   6 SAVE THIS
 RACE"
338 ? "3 SCRATCH A HORSE    7 DELETE A
FILE"
341 ? "4 SEE DISK FILES     8 QUIT"
344 ? :? "              CHOOSE==>";:GET #2,
NUM
347 POSITION 0,14:? BLANK$
350 NUM=VAL(CHR$(NUM))
353 ON NUM GOSUB 362,1028,1076,1055,11
00,1003,1067,1112
356 GOTO 293
359 REM ***Handycap a new Race***
362 GRAPHICS 0:POKE 710,196:POKE 712,2
42
365 POKE 710,196:POKE 712,242
368 POSITION 10,3:? "FOLLOW EACH ANSWE
R"
371 POSITION 13,4:? "WITH RETURN"
374 FOR DLY=1 TO 200:NEXT DLY
377 ? :? "WHAT TRACK ------- ";:INPUT
#1,TRK$
380 ? "DATE ------------- ";:INPUT #1,
DAT$
383 TRAP 383
386 POSITION 2,8:? "WHICH RACE -------
 ";:INPUT #1,RACE$
```

```
389 TRAP 389
392 POSITION 2,9:? "HOW MANY HORSES --
 ";:INPUT #1,N
395 IF N>12 THEN 392
398 ? :? "WHAT WAS THE APPROX DATE 3Ø
DAYS AGO"
4Ø1 ? "                   ===>";:INPUT #1,
DAY$:?
4Ø4 POSITION 6,15
4Ø7 ? "EVERYTHING ABOVE OK?(Y/N)";:GET
 #2,YN
41Ø IF YN=ASC("Y") THEN GOTO 419
413 IF YN=ASC("N") THEN GOTO 362
416 GOTO 4Ø4
419 TRAP 4ØØØØ:? CHR$(125)
422 ? "A) Is this race a...."
425 ? :? "    Claiming race      Stakes r
ace"
428 ? :? "    Allowance race     Handicap
 race"
431 POSITION 5,8:? "Type in the letter
 ===>";:GET #2,A
434 IF A=ASC("C") THEN CLASS=833:GOTO
449
437 IF A=ASC("A") THEN CLASS=848:GOTO
449
44Ø IF A=ASC("S") THEN CLASS=89Ø:GOTO
449
443 IF A=ASC("H") THEN CLASS=89Ø:GOTO
449
446 GOTO 431
449 REM
452 POSITION 2,8:? "B) One Mile or mor
e (Y/N)";:GET #2,FL
454 IF FL=ASC("Y") OR FL=ASC("N") THEN
 464
461 GOTO 452
464 POSITION 2,1Ø:? "C) Is this a gras
s race (Y/N)";:GET #2,GR
468 IF GR=ASC("Y") OR GR=ASC("N") THEN
 479
473 GOTO 464
479 ? CHR$(125)
482 REM ***store names in pseudo array
***
485 ? "D) Type in the horses names":?
488 BL$=" ":BL$(1Ø)=BL$:BL$(2)=BL$
494 FOR HO=1 TO N:? "NO.";HO;"HORSE:";
:INPUT #1,TEMP$
5ØØ TL=LEN(TEMP$):IF TL<1Ø THEN TEMP$(
TL+1)=BL$
5Ø3 START=(HO-1)*1Ø+1:A$(START)=TEMP$:
NEXT HO
512 POSITION 6,21:? "EVERYTHING LOOK O
K (Y/N)";:GET #2,YN
515 IF YN=ASC("Y") THEN 527
518 IF YN=ASC("N") THEN 479
521 GOTO 512
524 REM *** Initialize Array ***
527 FOR HO=1 TO N:H(HO)=1Ø:NEXT HO
53Ø FOR HO=1 TO N:? CHR$(125)
533 START=(HO-1)*1Ø+1
536 ? "Lets Figure ";A$(START,START+9)
539 GOSUB CLASS
542 TRAP 542:? CHR$(125):? "Figuring "
;A$(START,START+9)
545 POSITION 3,3:? "2) Has He raced si
nce ";DAY$;" (Y/N)";:GET #2,YN
548 IF YN=ASC("Y") THEN 56Ø
551 IF YN=ASC("N") THEN FP=Ø:GOTO 569
554 GOTO 542
56Ø POSITION 6,4:? "Enter Finish posit
ion last race"
563 ? "(1,2,3,etc) ===>";:INPUT #1,FP
569 POSITION 3,7:? "3) In the last 6 r
aces"
572 POSITION 6,8:? "at a MAJOR track..
."
575 POSITION 6,1Ø:? "How many WINS ";:
INPUT WINS
578 POSITION 6,11:? "How many 2NDS ";:
INPUT TWOS
581 POSITION 6,13:? "at a MINOR track.
.."
584 POSITION 6,15:? "How many WINS ";:
INPUT WONS
587 POSITION 6,21:? "EVERYTHING LOOK O
K (Y/N)";:GET #2,YN
59Ø IF YN=ASC("Y") THEN 599
593 IF YN=ASC("N") THEN 542
596 GOTO 587
599 IF FP=1 THEN H(HO)=H(HO)+5
6Ø2 IF FP=2 THEN H(HO)=H(HO)+7
6Ø5 IF FP=3 THEN H(HO)=H(HO)+2
6Ø8 IF FP=4 THEN H(HO)=H(HO)+Ø
611 IF FP=5 THEN H(HO)=H(HO)-1
614 IF FP=6 THEN H(HO)=H(HO)-2
617 IF FP>6 THEN H(HO)=H(HO)-4
62Ø CPTS=WINS*2+TWOS+WONS
623 IF CPTS>=6 THEN H(HO)=H(HO)+8
626 IF CPTS=5 THEN H(HO)=H(HO)+6
629 IF CPTS=4 THEN H(HO)=H(HO)+4
632 IF CPTS=3 THEN H(HO)=H(HO)+3
635 IF CPTS=2 THEN H(HO)=H(HO)+1
638 IF CPTS=1 THEN H(HO)=H(HO)-2
641 IF CPTS=Ø THEN H(HO)=H(HO)-4
645 TRAP 645
653 ? CHR$(125):? "Figuring ";A$(START
,START+9)
656 POSITION 2,3:? "4)Find and add the
 two best first call"
659 POSITION 2,4:? "positions AT THIS
DISTANCE OR SHORTER"
662 ? :? :? "Example:    5 4 4 1 PINCAY
"
665 ? "                +2 2 1 1 SHOEMKR"
668 ? "                ___ "
671 ? "                 7    Enter Here ===>"
;:INPUT #1,LNGS
674 ES(HO)=LNGS
677 ? :? "5)Enter Todays Weight ===>";
:INPUT #1,LBS
68Ø WT(HO)=LBS
```

continued on next page

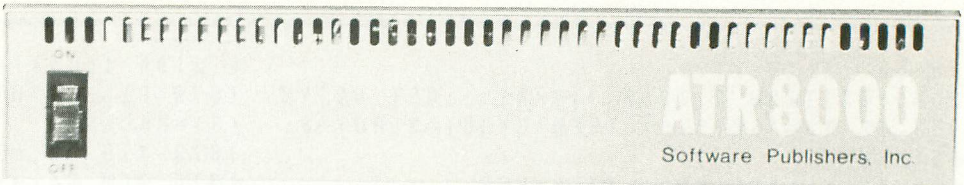
```
683 IF FL=ASC("Y") THEN GOSUB 917:REM
Mile?
686 IF GR=ASC("Y") THEN GOSUB 947:REM
Grass?
701 NEXT HO
704 POSITION 6,21:? "Stand by.........
........"
707 TRAP 40000
710 REM *** Transfer ES to SORT Array
***
713 FOR HO=1 TO N:SORT(HO)=ES(HO):NEXT
 HO
716 GOSUB 974
719 REM *** Adjust for ES rating ***
722 FOR HO=1 TO N:IF ES(HO)<=SORT(3) T
HEN H(HO)=H(HO)+3:GOTO 728
725 H(HO)=H(HO)-2
728 NEXT HO
731 REM *** Transfer WT to SORT Array
***
734 FOR HO=1 TO N:SORT(HO)=WT(HO):NEXT
 HO
737 GOSUB 974:REM Sort SORT(HO)
740 REM *** Adjust for WT rating ***
743 FOR HO=1 TO N:IF WT(HO)>=SORT(N-2)
 THEN H(HO)=H(HO)+4:GOTO 749
746 H(HO)=H(HO)-3
749 NEXT HO
752 REM ***Minumum value=1***
755 FOR HO=1 TO N:IF H(HO)<=0 THEN H(H
O)=1:NEXT HO
764 RETURN
767 REM ***Figure and Display ODDS***
770 TOT=0
773 FOR HO=1 TO N
776 TOT=TOT+H(HO):NEXT HO
779 NUM=0.18:TOT=TOT*0.79:REM Less 21%
 Take
782 FOR HO=1 TO N
785 START=(HO-1)*10+1
788 PCT=0:PCT=H(HO)/TOT
794 IF PCT=0 THEN ODDS$="OUT":GOTO 815
:REM Scratch
797 REM ***If odds are higher then 9-2
(NUM) then figure exact***
800 IF PCT<NUM THEN ODDS$=STR$(INT(1/P
CT-1)):GOTO 815
803 REM ***If lower then 9-2 use Table
***
806 FOR LOOP=1 TO 17:READ TBL,ODDS$
809 IF PCT>TBL THEN GOTO 815
812 NEXT LOOP
815 IF PFLAG=1 THEN ? #7;A$(START,STAR
T+9);" ------ ";ODDS$:GOTO 824
818 IF HO>6 THEN POSITION 21,HO-3:? A$
(START,START+9);" -- ";ODDS$:GOTO 824
821 ? A$(START,START+9);" -- ";ODDS$
824 RESTORE 827:RESTORE 830:NEXT HO:CL
OSE #7:PFLAG=0:RETURN
827 DATA .85,1-5,.71,2-5,.67,1-2,.62,3
-5,.55,4-5,.5,EVEN,.45,6-5,.41,7-5,.4,
3-2,.38,8-5,.35,9-5
830 DATA .33,2,.28,5-2,.25,3,.22,7-2,.
2,4,.18,9-2
832 REM
833 POSITION 2,3:? "1)Has He ever fini
shed 1st or 2nd in"
836 POSITION 2,4:? "this class or high
er (Y/N)";:GET #2,YN
839 IF YN=ASC("Y") THEN H(HO)=H(HO)+4:
RETURN
842 IF YN=ASC("N") THEN H(HO)=H(HO)-3:
RETURN
845 GOTO 833
848 POSITION 2,3:? "1)Has He ever race
d in a Stakes or"
851 POSITION 2,4:? "  Handicap race? (
Y/N)";:GET #2,YN
854 IF YN=ASC("Y") THEN 863
857 IF YN=ASC("N") THEN 875
860 GOTO 848
863 POSITION 2,6:? "  Has He run in a
claimer since? (Y/N)";:GET #2,YN
866 IF YN=ASC("Y") THEN H(HO)=H(HO)-4:
RETURN
869 IF YN=ASC("N") THEN H(HO)=H(HO)+7:
RETURN
872 GOTO 863
875 POSITION 2,8:? "  Has He run only
Allowance or"
878 POSITION 2,9:? "  Non Claiming Mai
den Races (Y/N)?";:GET #2,YN
881 IF YN=ASC("Y") THEN RETURN
884 IF YN=ASC("N") THEN H(HO)=H(HO)-4:
RETURN
887 GOTO 875
890 POSITION 2,3:? "1)Has He ever race
d in a Stakes or"
893 POSITION 2,4:? "Handicap race? (Y/
N)";:GET #2,YN
896 IF YN=ASC("Y") THEN 905
899 IF YN=ASC("N") THEN H(HO)=H(HO)-4:
RETURN
902 GOTO 890
905 POSITION 2,6:? "Did He Win? (Y/N)"
;:GET #2,YN
908 IF YN=ASC("Y") THEN H(HO)=H(HO)+6:
RETURN
911 IF YN=ASC("N") THEN RETURN
914 GOTO 905
917 POSITION 2,14:? "6)Was his last ra
ce a Mile or more?"
920 POSITION 2,15:? "(Y/N)";:GET #2,YN
923 IF YN=ASC("Y") THEN H(HO)=H(HO)+3:
RETURN
926 IF YN=ASC("N") THEN 932
929 GOTO 917
932 POSITION 2,16:? "Any Race at a Mil
e or more? (Y/N)";:GET #2,YN
935 IF YN=ASC("Y") THEN H(HO)=H(HO)+1:
RETURN
938 IF YN=ASC("N") THEN RETURN
941 GOTO 932
947 POSITION 2,18:? "7)Was his last ra
```

```
ce on the Turf?"
950 POSITION 2,19:? "(Y/N)";:GET #2,YN
953 IF YN=ASC("Y") THEN H(HO)=H(HO)+3:
RETURN
956 IF YN=ASC("N") THEN 962
959 GOTO 947
962 POSITION 2,20:? "Any Race at on th
e Turf? (Y/N)";:GET #2,YN
965 IF YN=ASC("Y") THEN H(HO)=H(HO)+1:
RETURN
968 IF YN=ASC("N") THEN RETURN
971 GOTO 962
974 REM *** Sort Routine ***
977 N=HO-1:M=N
980 M=INT(M/2):IF M=0 THEN RETURN
983 FOR J=1 TO N-M:HO=J
986 L=HO+M
989 IF SORT(HO)<=SORT(L) THEN 995
992 X=SORT(HO):SORT(HO)=SORT(L):SORT(L
)=X:HO=HO-M:IF HO>=1 THEN 986
995 NEXT J
998 GOTO 980
1001 REM Save a race to Disk
1003 TRAP 1023
1004 IF N=0 THEN POSITION 0,16:? "No F
ield!":? CHR$(253):RETURN
1007 POSITION 0,16:? "Saving Race ";RA
CE$
1010 FILE$="D1:":FILE$(4)="RACE":FILE$
(8)=RACE$
1013 OPEN #5,8,0,FILE$
1016 ? #5;TRK$;CHR$(155);DAT$;CHR$(155
);RACE$;CHR$(155);A$;CHR$(155);N
1019 FOR HO=1 TO N:? #5;H(HO):NEXT HO
1022 CLOSE #5:RETURN
1023 CLOSE #5:? "Disk full or Write Pr
otected":? CHR$(253):FOR DLY=1 TO 150:
NEXT DLY:RETURN
1025 REM Get a race from Disk
1028 POSITION 0,16:? "Which Race Numbe
r ==>";:INPUT RACE$
1031 FILE$="D1:":FILE$(4)="RACE":FILE$
(8)=RACE$
1034 TRAP 1049
1037 OPEN #5,4,0,FILE$
1040 INPUT #5;TRK$,DAT$,RACE$,A$,N
1043 FOR HO=1 TO N:INPUT #5;DATA:H(HO)
=DATA:NEXT HO
1046 CLOSE #5:RETURN
1049 ? "No Race NO. ";RACE$;" ";"on Di
sk"
1052 ? CHR$(253):FOR DLY=1 TO 100:NEXT
 DLY:GOTO 1046
1054 REM *** Read Disk Files ***
1055 GRAPHICS 0:OPEN #7,6,0,"D:*.*"
1058 INPUT #7;FILE$:? FILE$
1061 IF FILE$(5,8)="FREE" THEN CLOSE #
7:? :? "    Hit RETURN ";:GET #2,WAIT:R
ETURN
1064 GOTO 1058
1066 REM *** Delete a File ***
1067 POSITION 0,14:? "Which Race do yo
u wish to delete? ";:INPUT RACE$
1070 FILE$="D1:":FILE$(4)="RACE":FILE$
(8)=RACE$
1073 XIO 33,#7,0,0,FILE$:RETURN
1076 REM Scratches
1079 IF N=0 THEN POSITION 0,16:? "No F
ield!":? CHR$(253):RETURN
1082 POSITION 0,16:? "Type in the Hors
es name";:INPUT TEMP$
1085 TL=LEN(TEMP$)
1088 FOR HO=1 TO N
1091 START=(HO-1)*10+1
1094 IF TEMP$=A$(START,START-1+TL) THE
N A$(START,START+9)="SCRATCHED ":H(HO)
=0:RETURN
1097 NEXT HO:? CHR$(253):? "None by th
at Name (Spelling?)":FOR DLY=1 TO 150:
NEXT DLY:RETURN
1099 REM *** Print a Race ***
1100 IF N=0 THEN POSITION 0,16:? "No F
ield!":? CHR$(253):RETURN
1103 OPEN #7,8,0,"P:":POSITION 0,16:?
"Position the Paper Then Hit RETURN";:
GET #2,WAIT
1106 PFLAG=1:PRINT #7;TRK$;"    ";DAT$;"
 RACE:";RACE$:? #7
1109 GOSUB 770:RETURN
1112 GRAPHICS 0:CLOSE #1:CLOSE #2:END
```

TYPO TABLE

Variable checksum = 2625986

Line num range		Code	Length
100	– 134	AW	577
137	– 164	AJ	534
167	– 200	YZ	396
206	– 239	DX	518
242	– 272	SD	543
275	– 308	AP	413
311	– 344	IK	394
347	– 380	TO	436
383	– 416	KH	387
419	– 452	IG	432
454	– 503	GS	430
512	– 545	TJ	422
548	– 587	BF	503
590	– 623	FV	358
626	– 665	CS	468
668	– 713	DU	356
716	– 749	TY	374
752	– 794	UR	337
797	– 827	OR	512
830	– 860	PP	446
863	– 896	BJ	504
899	– 932	NH	425
935	– 971	MC	379
974	– 1004	ZR	325
1007	– 1037	CQ	500
1040	– 1067	WA	453
1070	– 1100	DU	529
1103	– 1112	PQ	218



ADD IBM OR CP/M COMPATIBILITY TO YOUR SYSTEM

The ATR8000 fills a variety of roles

If you're looking to upgrade your Atari PC and you are not a beginner, you should consider the many advantages offered by the **ATR8000** from SWP, 2500 E. Randol Mill Rd., Suite 125, Arlington, Texas 76011. The 16K and 64K ATR's, first reviewed in these pages in the July, 1983 issue, are briefly covered here again for the benefit of our newer readers.

The versatile ATR can assume a variety of roles, depending on your needs. The simplest ATR, described as the 16K ATR8000 Atari interface, costs $350. It provides connections for standard disk drives, a parallel printer, and serial data communications. Because you can attach standard off-the-shelf disk drives to the ATR interface, you don't need to buy one of the more expensive drives designed expressly for the Atari. SWP supplies an Operating System, called MYDOS that lets you use any drive with your Atari PC. A standard 5 1/4-inch drive will have difficulty loading heavily protected commercial software; SWP gets conflicting reports on this so call them if you're in doubt. You should bear in mind that good-quality standard drives only cost about $200, and can yield substantial savings, particularly with multi-drive systems, when compared with Atari-specific drives. You can attach as many as four drives, including any combination of eight-inch, five-inch standard, and five-inch Atari drives, to the ATR8000. Since you can plug an Atari drive into an ATR any load problems can be overcome.

The ATR's printer port lets you attach any Centronics-compatible printer. In this application, the ATR's 16K of RAM acts as a printer buffer, leaving you more time for computing. See "Printers and Spoolers" by David and Sandy Small (**Antic**, April 1984) for an in-depth discussion of the ATR as a printer spooler. The ATR's RS-232 (serial data communications) port allows you to attach a modem or a serial printer. Thus, the ATR eliminates the need for the hard-to-find Atari 850 Interface.

With the 64K ATR8000 ($500), or an upgrade from the 16K model, you become the proud owner of a complete CP/M computer, for which you can use your Atari PC as a terminal. CP/M is the most popular Operating System for eight-bit microcomputers, and there is a plethora of software available for it. This includes expensive and sophisticated programs for applications such as accounting and data base management, as well as a vast amount of free, public domain CP/M software. The system runs double-density CP/M 2.2 on the ATR's Z-80 processor chip.

Most CP/M software requires an 80-column display, but standard Atari computers can display only 40 columns across. If you have an Atari 800 (not the XL series), you can obtain a true 80-column display by using the **Bit 3** board ($299 from Bit 3, 8120 Penn Ave. S., Suite 548, Minneapolis, Minnesota 55431; (612) 881-6955). The board is supported by software that comes with the 64K ATR8000. SWP offers two other compromise schemes, but the Bit 3 board provides the highest-quality display.

By upgrading the ATR with an option called Co-Power-88, you can attain the ultimate—IBM-PC compatibility for your Atari! Co-Power-88 uses the same 8088 processor chip used by IBM and its clones, and lets you use the MS-DOS Operating System with the ATR. **Antic** will cover Co-Power-88 more extensively in a future issue.

by DAVID DUBERMAN
Technical Editor

ANNOUNCING A MAJOR BREAKTHROUGH FOR ATARI COMPUTERS:



The Superbly Engineered Indus GT™ Disk Drive *The Critically Acclaimed Miles Accounting System II™*

PLUG-IN BUSINESS/ ACCOUNTING POWER.

These state-of-the-art components
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EQUIVALENT SYSTEM PRICE COMPARISONS:

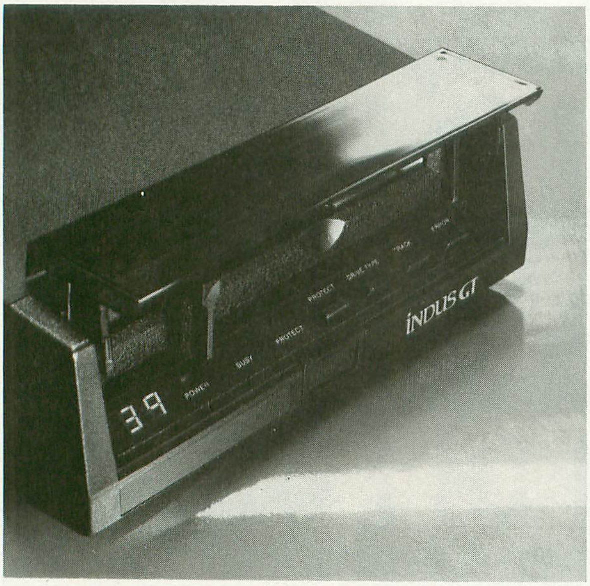
	ATARI 800XL	Apple //e	IBM PC
Computer w/64K and 2 Disk Drives	1297	2445	2633
Monitor with Interface and Cable	121	incl	680
Printer Interface and Cable	134	120	205
Printer	449	449	595
TOTAL HARDWARE	**1991**	**3014**	**4113**
General Ledger	145	395	595
Accounts Receivable	145	395	595
Accounts Payable	145	395	595
Payroll	FREE!	395	595
TOTAL SOFTWARE	**435**	**1590**	**2380**
TOTAL PACKAGE	**2426**	**4594**	**6493**

Based on Manufactuers Suggested Retail Price as of 4/84. Actual dealer price may vary.

Compare Indus GT performance with other drives.

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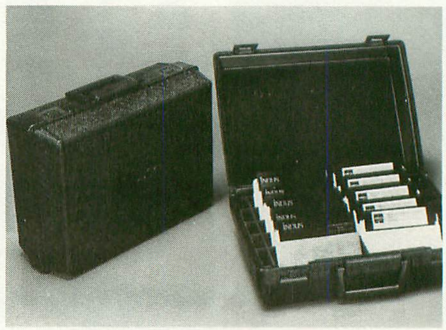
And while you're comparing, consider the built-in software that comes with every Indus GT: A comprehensive word processing package, an electronic spreadsheet, and a data base manager.

That adds up to formidable Atari performance at about *half the price of an Apple*; hardly a "games" machine!

Reliability. Convenience. Protection. Take them for granted with Indus.

A smart, smoked-glass dust cover, activated by air-drive. The AccuTouch™ push-button control system. These are just two of the *extra* operating innovations built into your Indus GT. These big steps beyond the ordinary assure hassle-free daily operation, and unusually long drive life.

Innovations in convenience abound. Automatic display of head-positioning; LED-lit *Busy* and *Protect* lights, and a two-digit LED register, only scratch the surface. And *every* Indus GT includes a rugged, molded PortaCase™ that doubles as an 80 disk library.



The Indus GT is also the *perfect* storage peripheral to power the incomparable, Miles Accounting System II.

Please send me information on Indus GT disk drives and the Miles Accounting System II business software.

YES NO

☐ ☐ I currently own an Atari. Model #______

☐ ☐ I currently own a disk drive. Brand: ______

☐ ☐ I currently own Miles Accounting System II modules. They are: ______

YOUR NAME ______

COMPANY ______

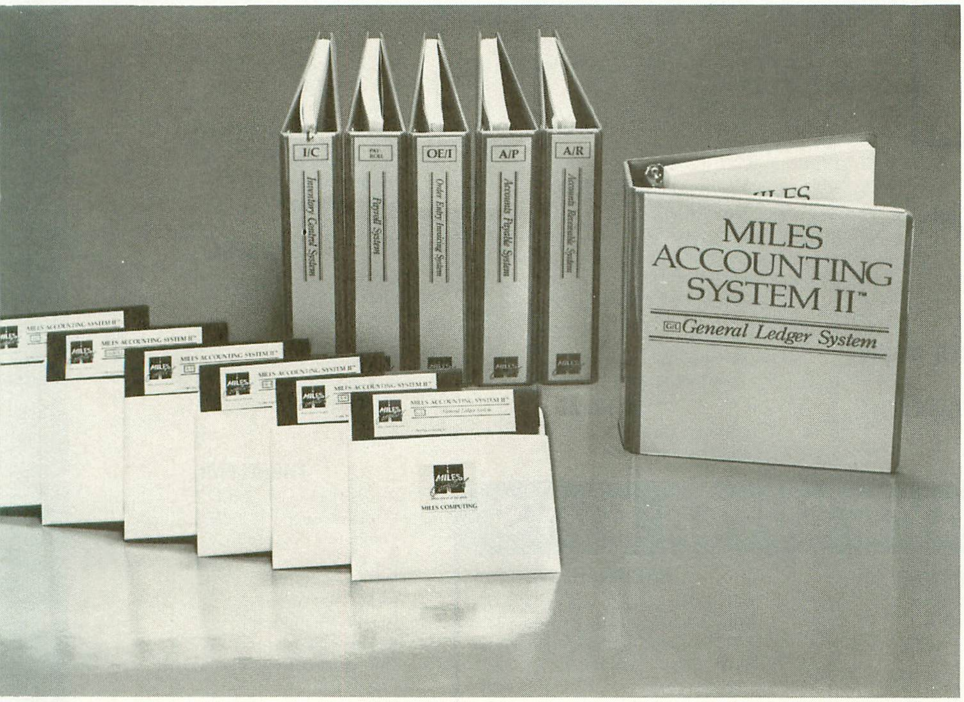
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For all of it's versatility and sheer power, your "new" Atari system is utterly simple to use... even for beginners.

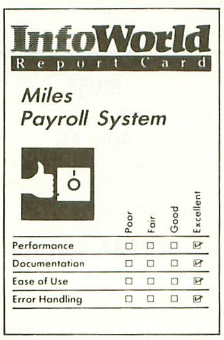
As ingenious as the Miles Accounting System II is, the true genious is that the programs have been written to enable virtually *anyone* to master them quickly. And the documentation is excellent; logical, clear and concise.

User support is guaranteed because Miles Computing is a company that *cares* about its customers. That is evidenced by their willingness to show you before you buy. With that in mind, drop by your local computer store and see our self-running demonstration of the Miles Accounting System II.

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The critics agree. Miles Accounting System II is not only the finest accounting system available for the Atari today, but it rivals any system available for other personal computers. And it's the other half of the astonishing new Atari business power package.

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Here's the Bottom Line:
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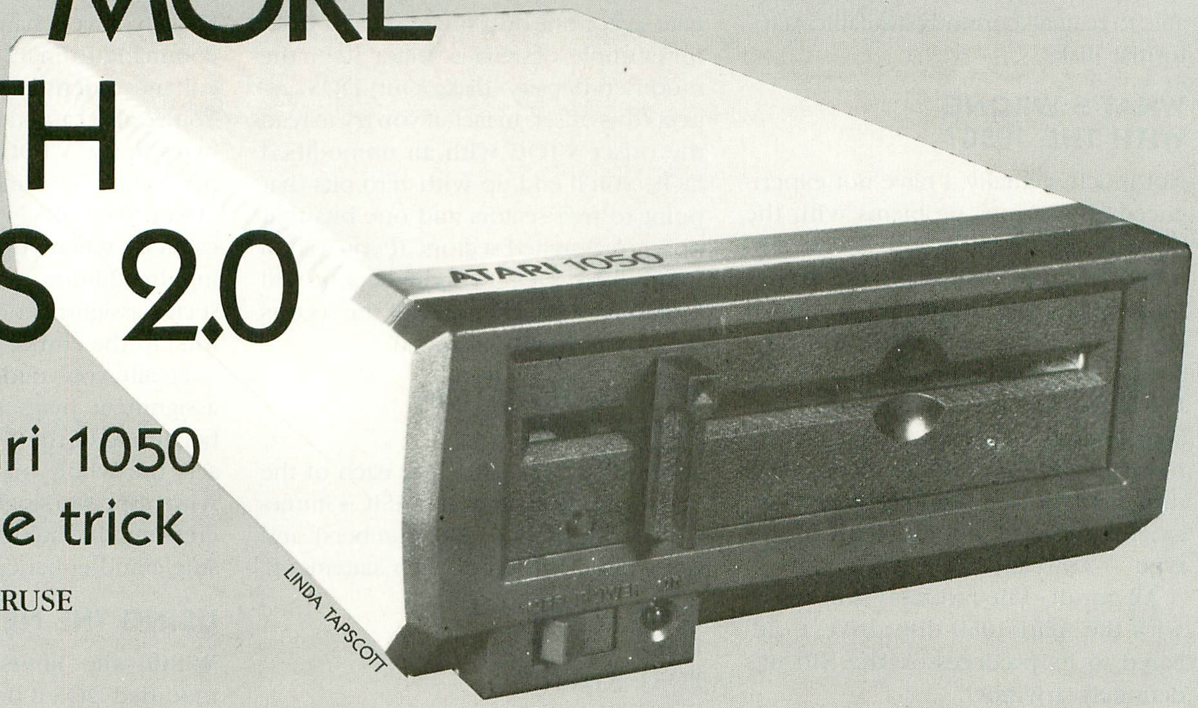
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DO MORE WITH DOS 2.0



The Atari 1050 does the trick

by RICHARD KRUSE

The Atari 1050 disk drive has a lot to offer: excellent performance, economical size, and the ability to increase disk storage with **DOS 2.0**.

The 1050 is smaller than the 810 (3 1/2-in. high by 7 1/2-in. wide by 12-in. deep), and its brown and white colors match those of the Atari XL line. In place of the 810's snap-down disk-door latch, the 1050 features a horizontal slot and an easy-to-use door mechanism. To insert a disk, you simply turn the latch bar clockwise ninety degrees. To release the disk, turn the latch counter-clockwise.

The 1050's power supply is the familiar wall-transformer type used on all Atari peripherals. Two serial-bus connectors (a cable is included with the unit), the power-cord receptacle, and a drive number-selector switch are located at the back of the 1050.

Overall, the 1050 is better designed than the 810, and its performance so far has been rock solid. It features a single printed circuit board. The 810, on the other hand, had two, three, or more circuit boards, depending on the manufacture date. The simple design of the 1050 has resulted in greater manufacturing efficiency, lower cost and higher reliability.

The unit's drive mechanism is the Tandon **TM-50** half-height drive. A belt drive connects the motor and disk spindle. A single read/write head (single-side recording) is positioned by the split-band mechanism, a design favored by most drive manufacturers.

The 1050's circuit board is mounted horizontally beneath the drive mechanism, and extends most of the length and width of the box. Its most important components include the 6507 microprocessor, the 6532 I/O-timer device, a 6810 RAM chip, a ROM chip (with a large Tandon copyright notice affixed) and a 2793 disk-controller chip. The 2793 is a state-of-the-art FM/MFM disk controller that contains both analog and digital circuitry (including a data separator). There are no pots or adjustments of any kind on the board.

There are no conventional screws or fasteners in the 1050. Instead, plastic clips molded into the case hold the circuit board. Plastic pins, posts and bumpers also secure the drive mechanism. If you shake the box, you can hear the circuit board and drive mechanism rattle. Treat this unit carefully!

TABLE 1.
Capacity and Performance:

DOS 2.0	**DOS 2.0 Modified**
40 Tracks	40 Tracks
18 Sectors/track	26 Sectors/track
720 Total sectors	1040 Total sectors
128 Bytes/sector	128 Bytes/sector
92160 Free bytes	133120 Free bytes

FORMAT AND COMPATIBILITY

The 1050 drive can operate in either a single-density, 810-compatible mode or in the new enhanced-density mode. Mode selection is automatic and transparent to the user.

The key to this ingenious mode-selection process is the way the disk "whirs" for a few moments when a new disk is inserted. The first sector of the track is read at this time, and the drive determines the new disk's density and sets its internal parameters accordingly.

The 1050 accepts two "Format diskette" commands. One (SIO command code $21) produces a format that is identical to the 810 drive (see Table 1). The second command (SIO command code $22) is available only on the 1050. It creates an enhanced-density format on the disk.

Using standard DOS 2.0 and the 1050 drive, you can read, write and even for-

continued on next page

mat disks and then swap them freely with the 810 drive. The 1050 drive is able to read all currently available Atari-format disks.

WHAT'S WRONG WITH THE 1050?

Not much, actually. I have not experienced any serious problems with the drive during several months of use. I'm a little disappointed with the 1050's track-seek speed, however—it's much slower than that of the 810. Also, the 1050's head positioning is noisy. Finally, I've heard of at least two incidences of actual failure of the track-seek mechanism. It is not clear yet whether this will turn out to be a common problem. (We are not aware of any problems of this type. —ANTIC ED)

All in all, I'm favorably impressed with the Atari 1050 disk drive. Compared to its predecessor, the 810, it's definitely a winner.

EXPANDING DOS 2.0'S STORAGE CAPACITY

If you have a 1050 disk drive, you may want to try the following modification to DOS 2.0 while you're waiting for Atari's new **DOS 3.0** Operating System to be introduced. This procedure is very simple, and nets you 256 additional data sectors per disk—or 32,768 extra bytes. And you don't need an assembler, since I've listed the changes using BASIC's POKE command.

There is an important caveat to remember when you're running this modified DOS: Do not attempt to write any data to a single-density disk, because the Volume Table of Contents (VTOC) has been altered on this modified version of DOS.

On each DOS 2.0 disk, sector 360 stores the VTOC. This VTOC data is organized so that each binary digit of data indicates the in-use status of one of the 707 data sectors. Thirteen additional sectors are used for housekeeping functions by DOS. DOS changes the value of these bits every time a file is added or deleted. If a bit is set to zero, its corresponding sector is allocated to an active file. If a bit is set to one, this corresponding sector is free, and is available for re-assignment to a file.

Our DOS modification offsets the bit map by 32 bits and increases the size of the VTOC. The bit that used to designate sector one on a single-density disk, for example, designates sector 32 on the modified-density disk. Our DOS expects this offset. In fact, if you try to read the offset VTOC with an unmodified DOS, you'll end up with zero bits that point to free sectors and one bits that point to assigned sectors. If you ask an unmodified DOS to write data, it will probably overwrite some of the sectors that are currently assigned.

THE MODIFICATION PROCEDURE

To modify DOS 2.0, enter each of the following commands in BASIC's immediate mode (with no line numbers), and press [RETURN] after each statement:

```
POKE 1974,34
POKE 3363,34
POKE 3426,195
POKE 3434,3
POKE 3443,6
POKE 3450,128
POKE 3456,6
POKE 3460,51
POKE 4334,6
POKE 4359,5
POKE 4362,128
POKE 4418,6
```

Next, take these two additional steps:
1) Insert a blank disk into Drive 1, and format it:

```
X10 254, #1,0,0,"D:" [RETURN]
```

2) Write your new DOS.SYS to the newly formatted disk:

```
OPEN #1,8,0,"D:DOS.SYS":
CLOSE #1[RETURN]
```

You now have a formatted, modified-density disk that contains a single file, DOS.SYS. You should also transfer the DUP.SYS. file. Just use the "O" option on a one-drive system, or the "C" option on a system with two or more drives.

Do not use the "J" option (copy disk) to transfer files between disks with different formats, because the J option copies both files and the VTOC. The VTOC holds our new sector-assignment information, and it's the VTOC that will be incompatible with a disk that's formatted in a different way.

WHAT YOU'VE DONE

You've just made a number of changes. First, you've changed DOS's format command from \$21 to \$22, the 1050's enhanced-density format command. You've also caused the available-sectors bytes in the VTOC to be initialized to the value 963, instead of 707. The "FREE SECTORS" value shows this new capacity when you do a directory listing. In addition, you've added 28 new sector-assignment bytes (224 new sectors) to the end of the VTOC bit map.

Finally, you've added four new sector-assignment bytes (32 sectors) to the beginning of the VTOC map. This offsets the whole bit map by 32 sectors with respect to single-density disks, thus creating the incompatibility between single and enhanced-density disks.

USING THE NEW DOS

Within the limits mentioned, your modified DOS 2.0 will work the same way as the unmodified version. Just remember not to perform any DOS operations with this modified DOS that writes to a single-density disk. Similarly, do not perform any DOS operations that write to an enhanced-density disk while you're running a single-density DOS. This includes directory operations such as lock, unlock, rename and delete.

You can safely READ files into memory, and COPY files to your new disk. Be sure, however, that you've booted up with your *target* DOS, the one that will receive the data.

Some programs, including a number of disk utilities, as well as commercial programs that don't directly access sectors and/or that include their own file-management systems, will not work with this new format. Since there is always a danger of destroying valuable data in such cases, you should always test a copy of the program, using a "scratch" data disk if one is required, before you proceed.

Richard Kruse, an electronics engineer living in Wichita, Kansas, worked most recently for NCR. He currently runs a small Atari-specific business out of his home. His company's products include a memory-expansion board and two software packages.

Clean up the computer clutter.

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MICRO-OFFICE WORK CENTER

Chances are you have spent a couple thousand dollars on setting up a computer system that gets a lot of your work done. But sometimes it gets to be work to work at it.

I know that when I have to move two program manuals and a pencil holder to boot up the disk drive, it is work. When there is an unlabeled floppy (that I am going to identify some day) on top of the monitor and the business checkbook is on top of the printer . . . and I will remember (I hope) before the next "report" comes through . . . that is work.

I found the annoyance of my own "computer clutter" was even worse than the extra work the disorder created. And that is when I started looking for some practical furniture for my computer set up. Since I had already spent a lot of money on the system itself, I was really dismayed when I found out how much it would cost to get a decent-looking desk or even a data table for my equipment. $400 . . . $500 . . . even more for a sleasy unit that looked like junk! In fact, it was junk! And it took a long time for me to find something that was really worth the money . . . and more.

A lot of my working day is spent with my computer, and I will bet a lot of your time is too. So I figure a "home" for my system—a housing that is good looking as well as efficient to work at—will pay off two ways:

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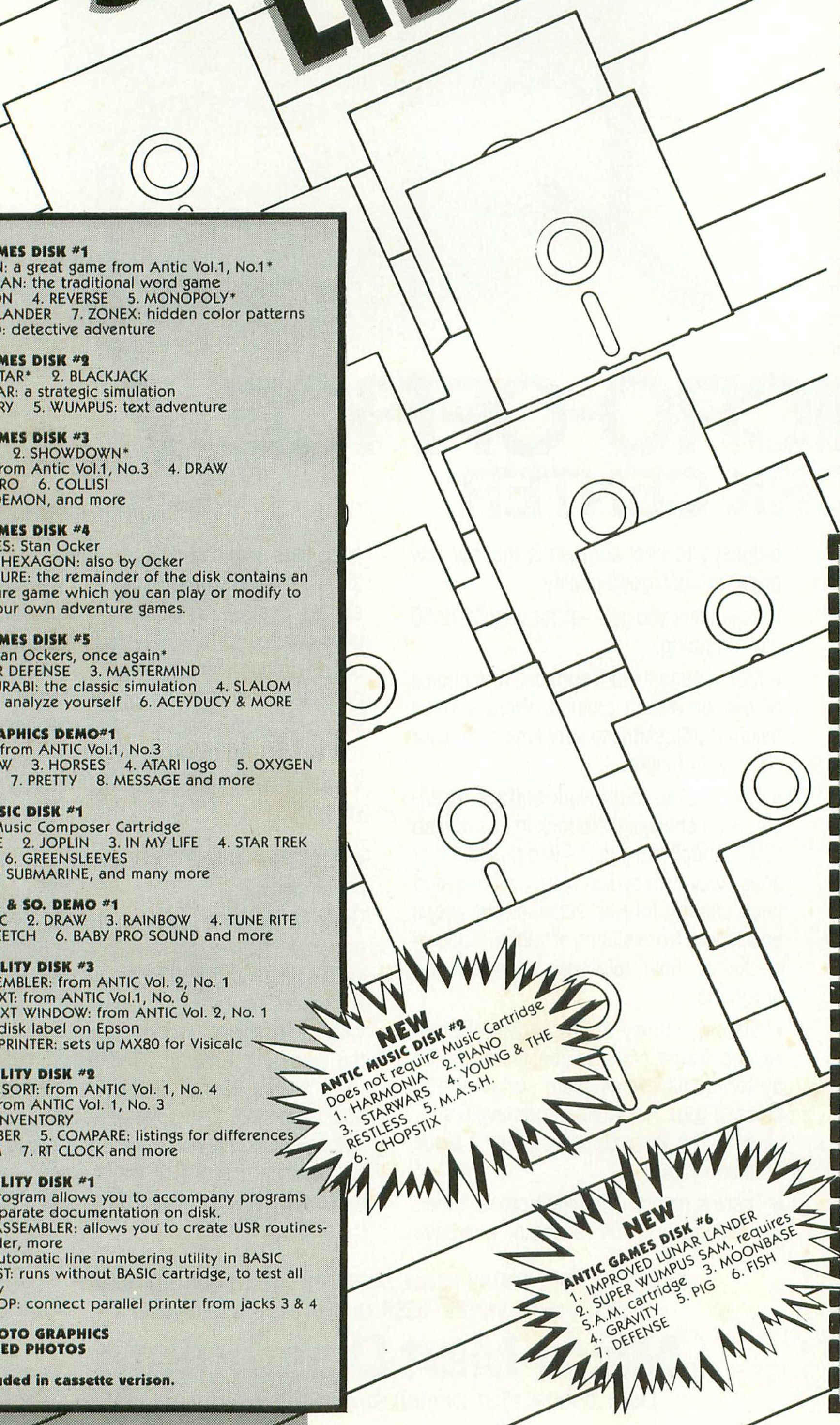
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DISK DRIVE SURVEY

by LAWRENCE DZIEGIELEWSKI

Are you in the market for a disk drive? If so, you're probably aware of the many alternatives you have. At least six manufacturers market "Atari-compatible" disk drives, each of which offers one or more unique features. It can be difficult to determine which drive offers the best combination of features you really need.

This survey presents a variety of choices for anyone who wants to add a drive to his or her Atari PC system. It includes five of the best drives available today, all of which list for less than $600, though you can expect to find most of them offered at significant discounts by mail-order distributors. I've evaluated each drive for price, performance, features, and expandability of the system (slave drives, etc.).

The drives fall into three categories: top-of-the-line (Trak AT-D2), full-featured (Rana 1000 and Indus GT) and no-frills (Atari 1050 and Astra 1620 drives).

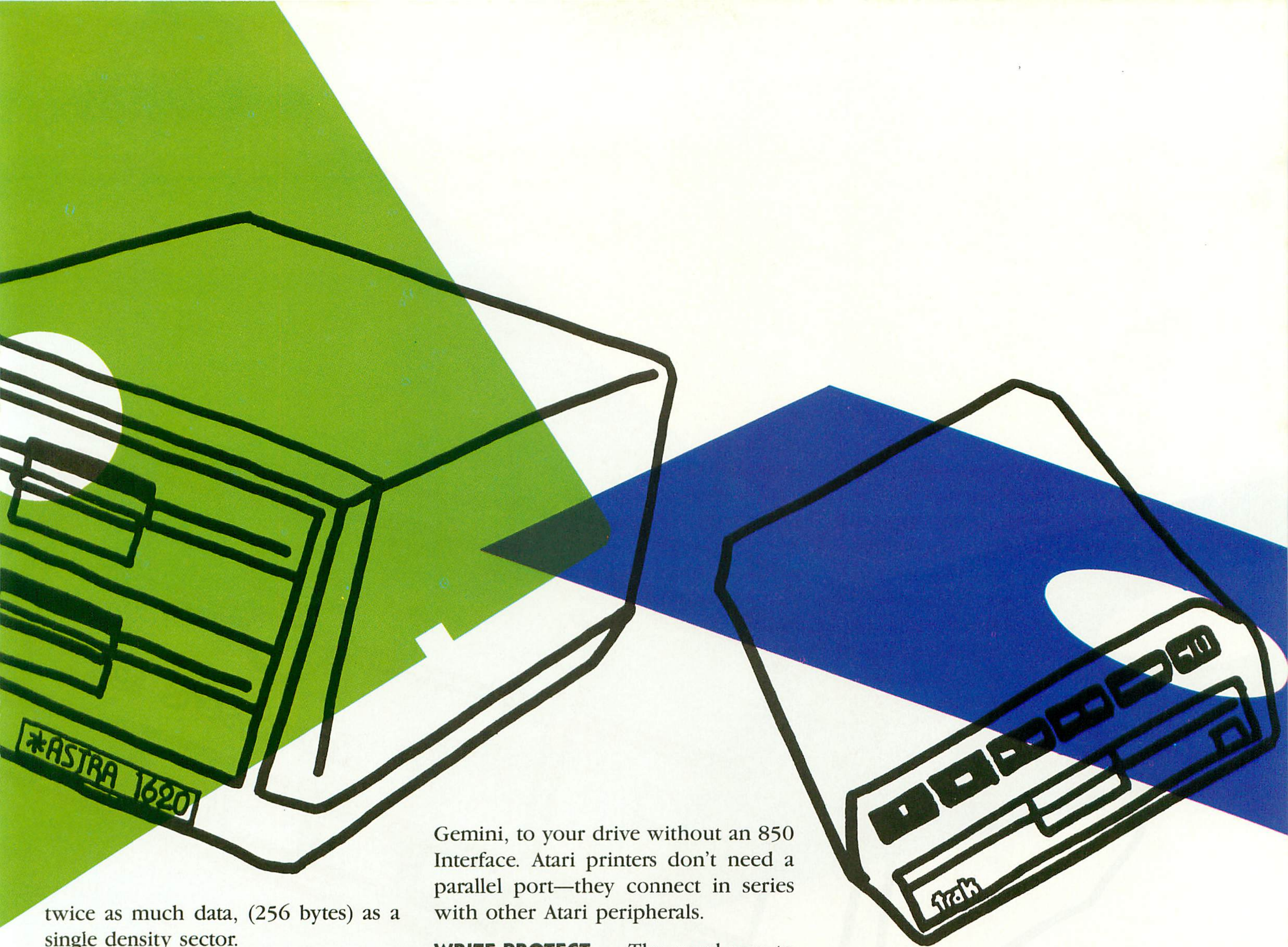
Of primary importance is software and hardware compatibility. Some drives have problems loading copy-protected commercial software. In most instances, when such an incompatibility is found, the software manufacturers work with the drive manufacturers to solve the problem. As a result, the compatibility problem is disappearing rapidly.

I'll be using a number of terms that may be unfamiliar to you. The following "glossary" explains some of these terms.

DENSITY — Usually used in combination with "single" or "double," density refers to the amount of data that can be stored on a diskette.

SINGLE DENSITY — With Atari disk drives, single density refers to a storage scheme that uses 40 tracks, each of which holds 18 sectors. Each sector holds 128 bytes of data.

DOUBLE DENSITY — Atari disk drives that are capable of double-density operation also use 40 tracks of 18 sectors each. However, each sector holds



twice as much data, (256 bytes) as a single density sector.

ENHANCED DENSITY — This special density format is supported by Atari's DOS 3 and was developed by Atari specifically for its 1050 drive. As in single density, each sector holds 128 bytes. Instead of 18 sectors per track, though, there are 24 (for a total of 1040). An enhanced density disk holds about 127K of data.

SLAVE DRIVE OPTION — Most Atari disk drives include a "controller" that lets the computer communicate with that drive. Some controllers can control more than one disk drive. To these you can attach a "slave drive," a less expensive drive that doesn't have a controller. The only drive in this survey that accepts slave drives, the Trak, must use slaves made by Trak. All drives in this review can be "daisy-chained," or connected in series of up to four drives.

PRINTER PORT — This lets you connect a parallel printer, such as an Epson or Gemini, to your drive without an 850 Interface. Atari printers don't need a parallel port—they connect in series with other Atari peripherals.

WRITE-PROTECT — The usual way to "write-protect" a diskette is to cover the notch on the disk's edge with a gummed sticker. This makes it impossible to SAVE a file or otherwise write or erase data on the disk. If a disk drive has a "write-protect" switch, you can use it for the same purpose and eliminate the need for write-protect stickers.

TRACK BUFFERING — An entire track of data is read into a RAM buffer in the drive. This reduces wear and tear on the drive mechanism. Ordinarily, however, track buffering does not speed up the rate of writing.

MTBF — Mean Time Between Failures. Manufacturers provide this information as an average indicator of reliability. As expressed here it's the average number of hours prior to failure.

DIAGNOSTICS — Drives with this feature can perform "self-tests" and report any problems to the user.

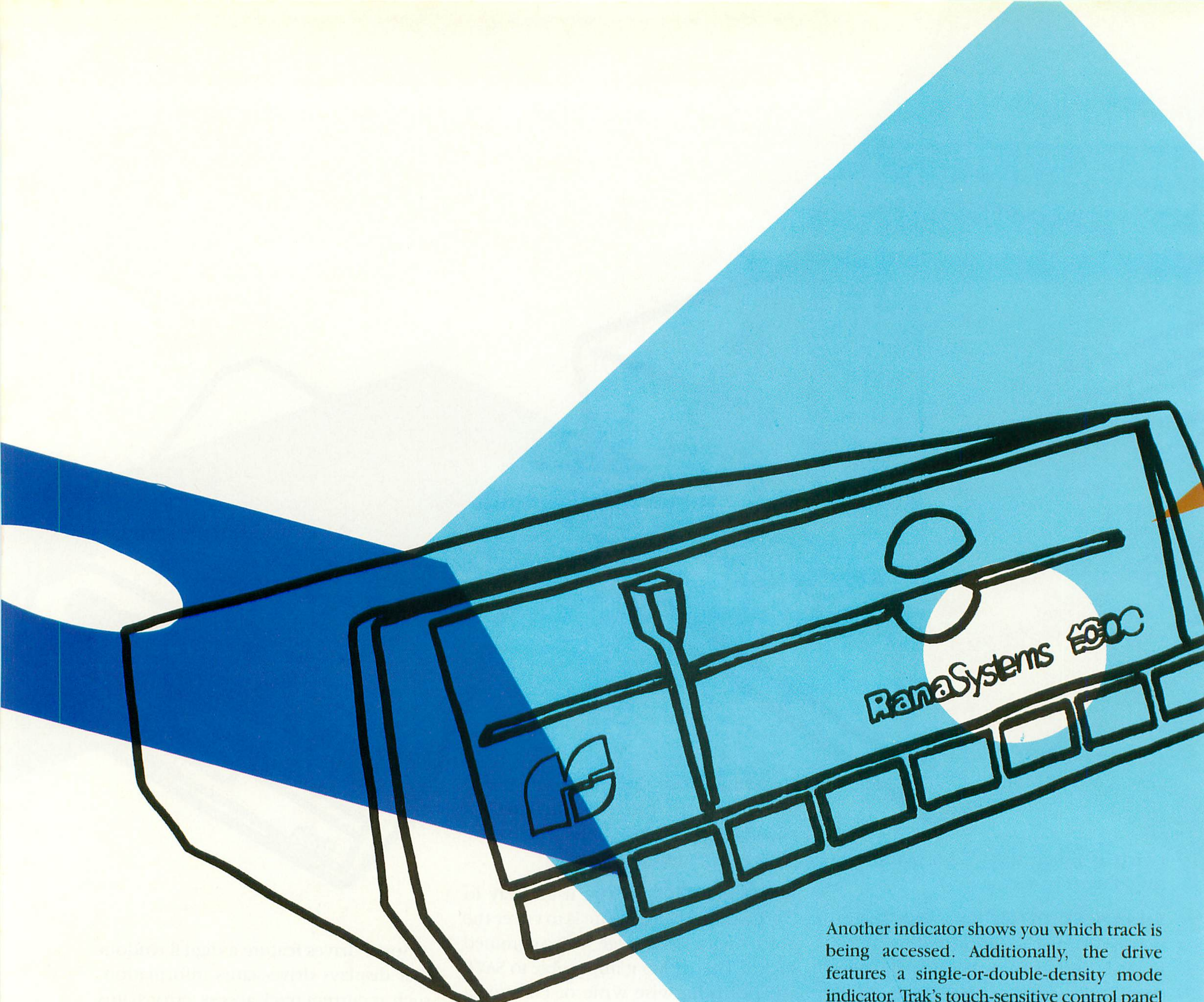
Some drives feature a digital readout that displays drive-status information, such as current track access, error status and number, and drive ID number (which is most useful in multi-drive systems). Experienced users will probably make greater use of this information than beginners.

ABOUT THE CHART

I used BATS (**Antic**, December/January 1983 & *The Best of Antic Anthology*), a 70-sector tokenized BASIC program to run comparison benchmarks on all of the drives in this survey. I LOADed and SAVEd the program seven times on each drive, then averaged the times. SAVEs were done both with and without write verification.

Although the Atari 810 drive is no longer available, I've also included it in the chart for purposes of comparison.

continued on next page



TRAK AT-D2



A relative newcomer to the Atari disk drive scene, Trak Microcomputer's "AT Series" of drives is centered around a half-height drive mechanism in a well-designed, compact case. The series includes the AT-1, the standard double-density drive. The next in line, AT-D1, is a single-density drive with a printer port and a 2K buffer. The AT-D1 is upgradable to double-density. The drive examined here is the **AT-D2**, the flagship of Trak's line. This drive can be operated in either single or double density.

FEATURES

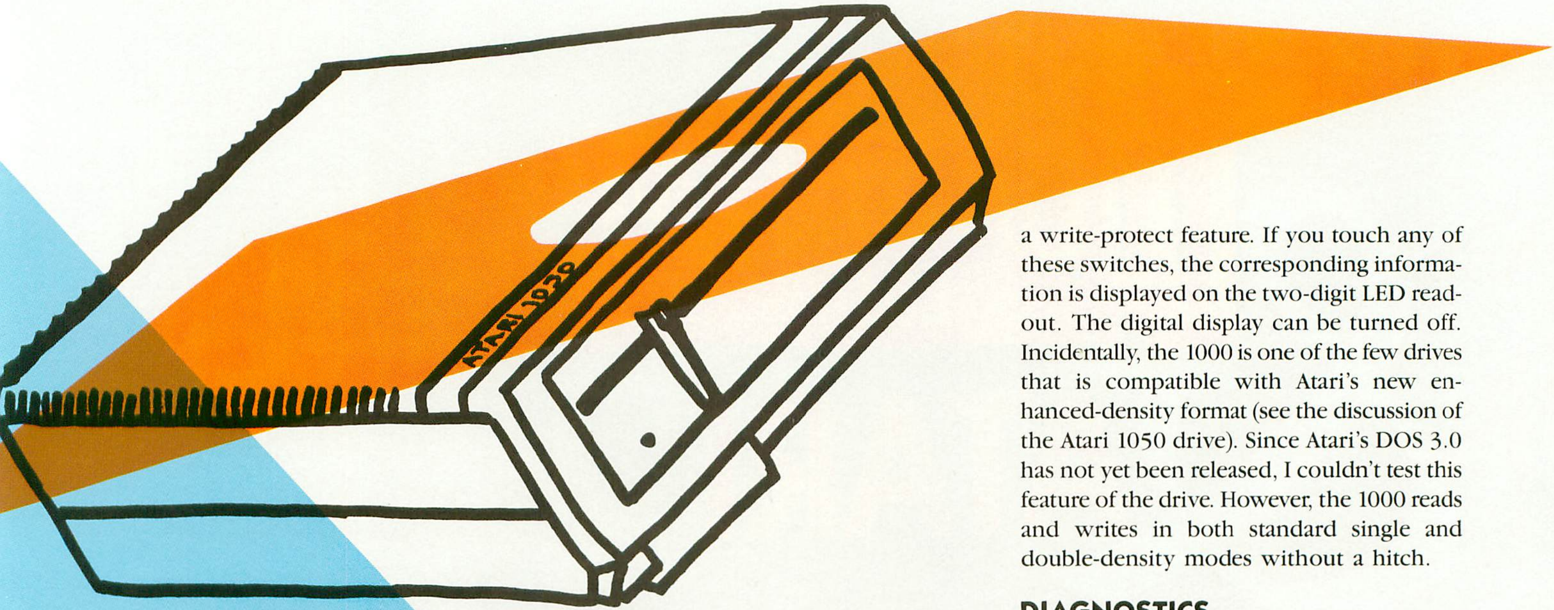
Included with the AT-D2 is a printer port with a 2K buffer, which can be upgraded to 16K. The AT-D2, like all drives in the AT Series, includes a touch-sensitive front panel. Brush your finger across the Trak logo, and the AT-D2 comes to life. The write-protect switch allows you to put an electronic write-protect tab on your disk, and the digital readout stays lit to assure you that the data on the disk is safe from accidental erasure. Another indicator shows you which track is being accessed. Additionally, the drive features a single-or-double-density mode indicator. Trak's touch-sensitive control panel is the best one I've used.

AUTOMATIC DIAGNOSTICS

Every time you power up the AT-D2, a diagnostic package puts the drive through a complete self-check. This operation, which takes only half a second, prints error messages to the screen or printer if there are any problems. If there are no problems, there is no message. (In fact, a message of reassurance, such as "System OK," would be a welcome addition.) If everything is OK, the drive resets itself and awaits a disk.

TURBO SOFTWARE

Trak's Turbo ROM (Read Only Memory) is available as an option for all Trak drives. Turbo allows the Trak drive to perform track-buffered reads (but not writes), thus speeding up data input rates. This $50 upgrade kit also includes an extra 2K of RAM, which expands the print buffer size to 4K.



CONCLUSION

The AT-D2 has a retail price of $499.99, making it a competitively-priced drive. All drives in the AT Series come with a 36-pin slave-drive port that uses a non-standard connector, so you must use Trak's slave drive, which costs $350. The AT-D2 has a 90-day warranty, and in everyday use, is an extremely reliable drive. It runs most of the software written for the Atari, including the latest protection formats. If you're looking for a good drive that's both easy to use and expandable, the Trak drive is certainly worth considering.

Trak's newest drive, the AT-D4, is the first double-sided double-density disk drive for Atari computers, and is available now. Also new from Trak is The Champ, a $399 no-frills, single-sided drive that handles all DOS's and densities. It also comes in a double-sided version, called The Champ 2, which comes with free software including Trak DOS, the game Pogoman, and a disk filing system. And you can add up to two Trak slave drives ($349) to The Champ. *(We will review these products in a future issue. —*ANTIC ED*)*

Trak Microcomputer Corp., 1511 Ogden Ave., Downer's Grove, IL 60515. (800) 323-4853, In IL call collect: (312) 968-1716.

RANA 1000



We begin our look at full-featured drives with the **Rana 1000**. Rana has been producing drives for Apple computers for several years; the 1000 is their first product for the Atari computer.

FIRST IMPRESSIONS

I must admit that I was a little surprised when I removed the Rana from its package. The first thing I noticed was that the row of small push-button switches (as depicted in Rana's advertisements) was missing from the front panel. Rana elected to use a touch-sensitive panel (similar to Trak's) in place of the buttons. Also changed was the drive-door mechanism also shown in the ads. A "pop-up" mechanism has taken its place. This door is awkward to use—I occasionally had trouble closing it. You must first push down on the door, then pull it outward.

The 1000 measures a compact 3″ × 7″ × 10.5″. Two 1000's stacked on top of each other occupy less space than a single Atari 810.

FEATURES

The 1000's touch-sensitive front panel is easy to operate. There are touch-pads for track number, drive mode (single or double-density), error status, drive ID number, and a write-protect feature. If you touch any of these switches, the corresponding information is displayed on the two-digit LED readout. The digital display can be turned off. Incidentally, the 1000 is one of the few drives that is compatible with Atari's new enhanced-density format (see the discussion of the Atari 1050 drive). Since Atari's DOS 3.0 has not yet been released, I couldn't test this feature of the drive. However, the 1000 reads and writes in both standard single and double-density modes without a hitch.

DIAGNOSTICS

By manipulating dipswitches on the back of the Rana, you can run one of nine diagnostic tests and routines. One of these lets you format a disk with no computer attached! Among the rest are tests of the drive's ability to read and write to a disk, both sequentially and at random.

CONCLUSION

Finding fault with the 1000 isn't easy, but there are a few quirks worth mentioning. First of all, the two-digit display is located at the bottom of the front panel, and unless the drive is pointed directly at you, the whole display is hard to see. Also, the 1000 lacks a slave-drive port. If you want to add a second drive, you must buy another drive at full price. Additionally, the door latch mechanism is difficult to use. *(Rana informs us that they're aware of these problems and are working to correct them. —*ANTIC ED*)*

At $399.00, the Rana 1000 is a good value. The warranty period is 120 days. The Rana is supplied with the SMARTDOS disk operating system. Although the Rana is a great drive, I really missed having a printer port at my disposal. If you don't need one, the Rana 1000 represents a great low-cost alternative to other drives on the market.

*(NOTE: There have been problems using data files from LJK products such as Letter Perfect and Continental Software products with Rana drives. The problem has been corrected with drives currently being shipped. If you own a Rana 1000, and get ERROR 138 or 144 when you try to use a data file, contact Bob Baker at RANA. —*ANTIC ED*)*

Rana Systems, 21300 Superior St., Chatsworth, CA 91311. (213) 709-5484.

continued on page 80

LUCASFILM Ltd & ATARI

Creative partners

by MICHAEL CIRAOLO, Editorial Assistant



On June 6, 1982, Lucasfilm Ltd. and Atari, Inc. announced a breathtaking collaboration, joining creative forces to produce home and arcade video games designed by the wizards of Lucasfilm. The stir this announcement created is imaginable, and now, two years later, the first two games are here.

Over a millenium later—you are a player in the greatest championship of all time. You control a rotofoil, a craft capable of reversing thrust at 600 meters per second as you play a soccer-like game. Except that the "ball" is about a half meter in diameter and weighs 1,000 kilograms. Except that the laws of physics belong to a different world, a set of laws that is consistent within the game, but not with your experience.

As you face your screen, the view from your rotofoil is the playing field. You also see your opponent's view, regardless of whether you're playing the computer or another human.

The team of five programmers and artists who brought you this magical sport belong to the Lucasfilm Computer Division Games Group. When they started two years ago, the team set out to create a game that maximized all of an Atari's resources—graphics, sound, hardware. The goal: a game that was fun, challenging, and imaginative. It had to be set in an unusual but realistic world in which real people could interact with their opponents. Finally, it wouldn't need complicated instructions.

"The original concept of the game was to have two (or many) objects attracting in the realistic world, using invisible forces based on realistic models," explains game group leader Peter Langston. "Although they may not be exactly what we experience in our world, the physical laws (in **Ballblazer**) are internally consistent and they make sense. And, as a result, when you play the game, you learn them and it feels good; you can predict what's going to happen in something that you've never tried before."

Langston, whose extensive game-writing background includes experience with the multi-user Unix system, said "The computer should be a medium to connect people together to play games. The real fun comes from playing with other people."

Although a player can choose to play the computer in Ballblazer, the game is primarily designed for two people. Ballblazer forces the player to think about his or her opponent. "It's hard because it's a sport," Langston said.

The realistic nature of Ballblazer rests on its internally consistent physics, its obvious relation to soccer or similar sports, and its familiar music—a fast-paced jazz score.

The sound for Ballblazer was produced by Langston, a musician



Model of Rescue on Fractalus game built by Lucasfilm.

with experience arranging and performing jazz, rock and American folk music. "One reviewer, an eminent jazz player, said it sounded like John Coltrane did it. I think that's my best compliment so far."

Ballblazer's design came mostly from David Levine, who studied electronic art and computer science at the University of Illinois' Computer Education Research Laboratory. "I saw games writing as the ideal field that allowed me to experiment with programming, graphics, sound, human interaction with the machines—it encompasses everything. Everything you can do with a computer, you have to do to write a good game. You have to do it well."

Levine conceived of the rotofoil, the playing field and the concept of the sport. "I've always been fascinated by invisible force fields—electromagnetic—electric and magnetic fields," he commented.

"Everything about the game is based on what graphic resources the Atari offered us," said Langston.

As you sit at the controls of your Valkyrie fighter, you contemplate your mission. You will be flying at speeds up to Mach 7.2 through hostile mountain territory and a poisonous atmosphere above a planet rotating once every nine minutes. You are well armed and well defended. Your mission: rescue comrade pilots stranded on the surface of Fractalus.

Welcome to **Rescue on Fractalus**, the second game from Lucasfilm. As you play, you're drawn into another world, as captivating and real as Luke Skywalker's final assault on the Death Star in *Star Wars*—except that this time, you're not watching a movie. You're in the middle of a Lucas film. The ever-changing graphics take you to another world, and your mission, which demands empathy and compassion, forces you into a new universe.

Play starts on level one and increases to a possible level 99, although even its creators haven't gotten beyond level 28, and don't think it's possible to approach 99. The longer you play—and the better you get—the more the game changes: higher levels contain higher risks and greater challenges.

Rescue on Fractalus is the brainchild of David Fox, whose experience includes extensive animation work on Ataris and writing several programming books.

One of Fox's goals in designing the game was to create "a credible, alternate universe."

Rescue's realism comes in part from the ever changing mountainous terrain the player must fly through. Extremely lifelike, the graphics were the idea of Loren Carpenter, the Lucasfilm guru of computer graphics whose credits include sequences in *Star Trek* and *Return of the Jedi*.

Carpenter, not actually a member of the games group, brought the team the concept of using fractal geometry to create realistic mountains.

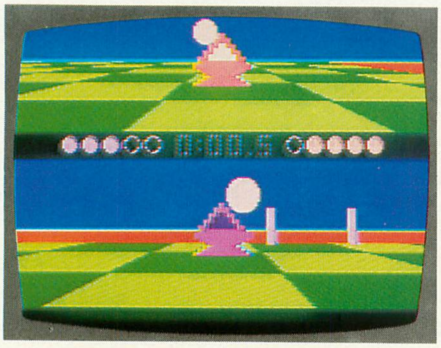
"Fractal shapes have a nice characteristic that, when you look at them closer up, they look very similar to the fractal shape at a distance. If you look at a little patch of the sky, you see it dotted with stars. If you take a little area of that and blow it up, you see something that looks very similar. It's called self-replicating," explained Langston.

The games team found fractals particularly useful, because instead of describing every terrain detail, fractal programming would fill in

continued on next page

any specified range with an interesting, natural-looking shape. The mountains look natural, but never identical—the programming can generate a total of 256 to the 256th power different scenes.

When a player crashes into one of these scenes, the game sounds a dirge. If a player completes a level, he or she receives a musical fanfare. The music for Rescue was composed primarily by Charlie Kellner, whose programming accomplishments include the Alpha Syntauri sound synthesizer. "Most of the time, I knew what I wanted to make it sound like. It was a matter of finding the right combination of sound effects with the machine (the Atari sound registers)," said Kellner, who brought to the group four and a half years experience with Apple computers and the 6502 processor, the same processor at the heart of the Atari.

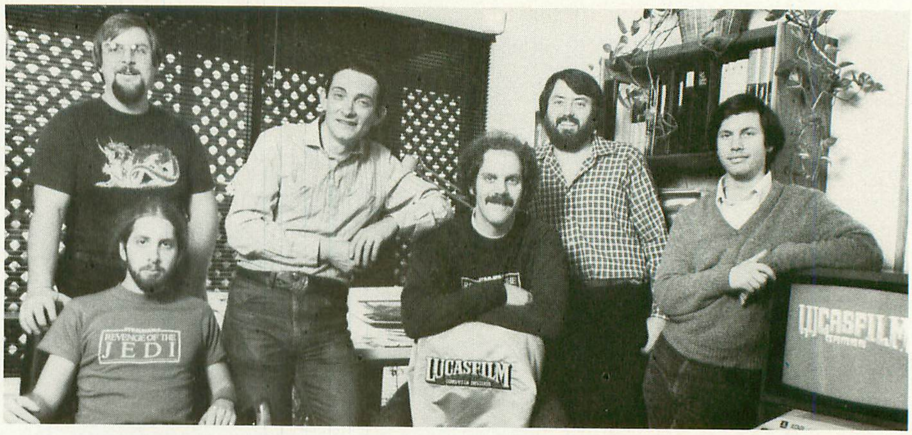


Sample screen from Ballblazer.

Two years ago, Lucasfilm hired Langston with an open charter—do something interesting in the games industry. By that time, Langston already had a reputation for developing games on the Unix system.

"I started hiring people who struck me as individuals who would go beyond what's already been done and who would have interesting, new ideas. And, in the process, we started looking at the industry and came up with all kinds of things we thought were being done wrong and should be done better," Langston said.

"When I hired these people, I didn't look for a particular quality. I looked for people who were real excited about what they were doing and had some certain thing that stood out—some view of the world that was different," said Langston. "I think that's the kind of



Lucasfilm's game programmers (left to right) Charlie Kellner, David Levine (seated), Peter Langston, David Fox, Loren Carpenter (of the Graphics Department) and Gary Winnick.

thing you can develop and go with; people will take a chance on educating you to the specifics of a particular job, because what they want is your creative excitement. If you learn to show that, then people will want to make you fit into what they're doing.

In putting together his team, Langston hired programmers (Fox, Levine, and Kellner). But the team included two musicians—Langston and Kellner—and one artist. This final team member was Gary Winnick, originally a commercial artist. Winnick worked at Atari before joining the Lucasfilm team and had a background in film animation, graphic arts and pixel art.

Langston's team decided to develop a couple of "throwaway" games—games taken through all the steps to help teach the team how to produce a video game. Prior to the design of those two throwaways—Ballblazer and Rescue on Fractalus—no one on the team had ever produced a video game.

"We made conscious design decisions to include or exclude things, and the fact that something seemed impossible to do was never a design criteria over and above wanting to do it, because everything seems impossible to do," Langston explained.

"Some of the things we did were things people told us were impossible. One of them was point-of-view games," said Langston. "We said, 'What do you mean, point-of-view games don't work?' We said that these games do work—they're the way we conduct our lives," said Langston.

Clearly, nothing's impossible. It takes the right combination of experience, imagination and art. Lucasfilm team members offered some insights into their trade and the talents a computer artist must have to rise to the top—say, a position in Lucasfilm.

For anyone interested in making an excellent contribution to a field, "You have to be very familiar with what has



Sample screen from Rescue on Fractalus.

already been done, or you end up reinventing the wheel," suggested Kellner.

"Find out what your abilities are—what you do well and what you enjoy doing. Then polish and perfect it," counseled Fox.

"Then, learn how to communicate back to a computer, using the methods of technology," added Levine, "because you have to be able to teach the computer what you do so well. There is an attention to detail in our games—quality—perfectionism."

Based on an interview conducted by James Capparell, Publisher, Antic Publishing, Inc., at Sprocket Systems, a division of Industrial Light and Magic in Marin County, California.

The first thing you notice about an Infocom game is its packaging. Quite simply, Infocom produces the most imaginative packages on the market. Remember the **Suspended** package, with the skull-mask eyes that stare at you from counter tops? Or **Deadline**'s detective case file?

Enchanter, the first game in a new fantasy series from Infocom, features a blue package with a jagged crack running across it. Open the package, and you find a parchment with a wax-embossed seal, a well-written and clever game booklet and the game disk itself.

An authentic-looking parchment with a wax seal? Yes, computer games have come a long way from the days when you got a mimeographed instruction sheet and a disk in a baggie. And we find it a lot easier to pay a high price for this sort of class act. The people at Infocom are trying hard to make you feel like part of the story, and packaging is an important part of this effort.

Upon reading the booklet and opening the sealed parchment, you discover that Belboz, chief of the Circle of Enchanters, has discovered that a new and powerful force for evil in the world is gaining power daily. Belboz also knows that the Ancients had foreseen this danger. According to a prophecy from some very old scrolls, the Ancients had divined that when this evil fell upon the land, "turning day into night," a new and inexperienced Enchanter should be the one to confront it. The Ancients felt that the evil force would disregard an inexperienced Enchanter, whereas a full member of the Circle of Enchanters would be challenged immediately.

Armed with four magic spells and a spell book, your task in Enchanter is to find and defeat the evil and powerful Krill. You journey past the Lonely Mountain (shades of Tolkien!) to Krill's castle, where you're in for all sorts of adventure.

This game differs from the Zork games in its lack of emphasis on the physical manipulation of objects (locating a key, for example) and its new emphasis on magical manipulation. Let's say that you arrive at a gate which is rusted shut. In **Zork**, you'd probably need to find some oil, lubricate the gate, and then push it open. In Enchanter, on the other hand, you need to cast the right spell to open the gate. To complete your task, you must discover enough spells to make your way past the various obstacles that block your path to Krill.

In some ways, there is a similarity between finding objects with which to manipulate your environment and casting spells, but we find the concept of casting spells far more romantic and exciting. Ah, if only we could discover a spell to repair the leaking gaskets on our Camaro.

JUST FRUSTRATING ENOUGH

We don't want to give away any of the solutions to the puzzles in this adventure; you'll have a great time figuring them out for yourself. We're growing much more comfortable with the Infocom games, and this one in particular, because they contain fewer of the "dead-end" puzzles that were found in the Zork series. Too many times in the earlier games, you'd come up against a puzzle that was unsolvable and that prevented you from advancing to the rest of the game. But in Enchanter, all sorts of subtle built-in aids help keep the game flowing smoothly. Indeed, we experienced just the right amount of frustration, if there is such a thing, until the end of the game. Earlier adventures tended to frustrate us needlessly.

Lebling and Blanc, who wrote the original mainframe and micro Zork games, also wrote Enchanter. Over time, they've mellowed a bit, veering away from puzzles with inconsistent environments that only a masochist could love (such as the Royal Puzzle in **Zork III**), and evolving a far smoother, and more sophisticated, style in which everything "hangs together." Since this is the key element that makes us like Enchanter so much, we'll try to explain further.

LOST IN THE STORY

When you're reading an engrossing novel, the worst thing that can happen is for the author to intrude and forcibly remind you that you're simply reading a book. The magic mood of the story is disrupted. This kind of intrusion happened frequently in the Zork series—for example, we recall an instance in which a flood-control dam shows up in the midst of an underground environment. Lebling and Blanc are both MIT graduates, so we can understand their tendency to emphasize the technology, but this sometimes gets in the way of the story. In the Zork games, the authors never let you forget that you're in the middle of a computer adventure written by computer programmers.

ENCHANTER IS DIFFERENT

But Enchanter is different. For the first time, we got the impression that the entire background story was laid out, the castle floormap designed, the history of the Circle of Enchanters written, and other groundwork completed *before* a single line of code was created. This is the only way to write a good, consistent fictional story (note, for example, the work that Tolkien did with the linguistic backgrounds of the Elves and Dwarves in *Lord of the Rings*). This is part of the process of creating a worthwhile story, and Infocom is doing it now.

Enchanter feels like a story, not a collection of puzzles loosely strung together. Perhaps this is due to the influence of the professional writers, such as Michael Berlyn, on Infocom's staff. Perhaps Blanc and Lebling are growing as writers and moving away from a programmer's view of adventure games. Finally, it may be that Infocom's programming tools are improving: This program handles much more varied input than the Zork programs and doesn't crash as easily. Infocom seems to be starting to think of its creations as interactive stories, rather than simply as computer programs.

We'd like to finish our discussion of Enchanter with a few notes for Zork fans. First of all, do you remember the room in Zork III in which a scene from **Zork IV** can be viewed? Well, that scene—a blood sacrifice ritual—is included in Enchanter; thus, Enchanter could be called Zork IV. Secondly, a sequel to Enchanter, called "Sorcerer," is due out about the time you read this review. Finally, according to an "unnamed source" at Infocom, a third game, also in the works at this time, will turn the series into a trilogy!

THE REALM OF THE PYRAMIDS

Michael Berlyn wrote several adventure

LINDA TAPSCOTT



EMBARK ON THE ROAD TO ADVENTURE

A look at three games from Infocom

by DAVID and SANDY SMALL

games before he joined Infocom; if you've seen **OO-Topos** or **Cyborg**, you're familiar with his earlier work. He's also published several books, so he's got credentials as both programmer and writer.

Infidel reveals the many sides of Berlyn. While it doesn't appeal as much to our deeper instincts as Enchanter does, it is still a good, well written game. In Infidel, you're a brash, young archaeologist. Tired of being an understudy to another explorer, you've decided to set out on your own. Alas, you don't know much about keeping your workers happy; when you demand that they work at the digs on a religious holiday, they drug your wine and leave you to die in the sun, as befits an infidel.

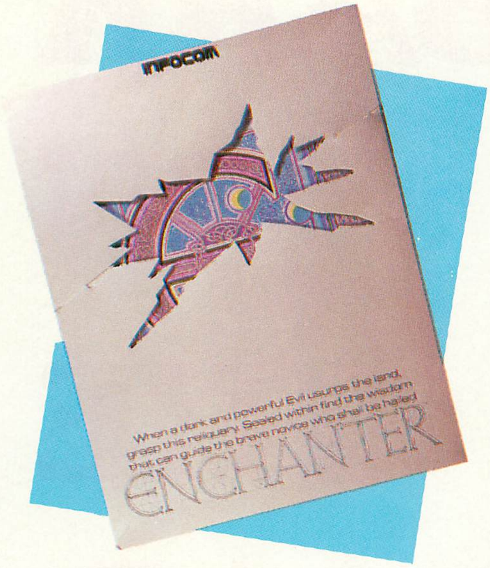
The game includes a great deal of historical information about the find you're exploring, along with details such as the letter you were writing when you passed out from the drugged wine, a map, several archaeological symbols, and a mysterious sketch of a cube remnant. Aside from these clues, though, you are on your own.

ANCIENT PUZZLES

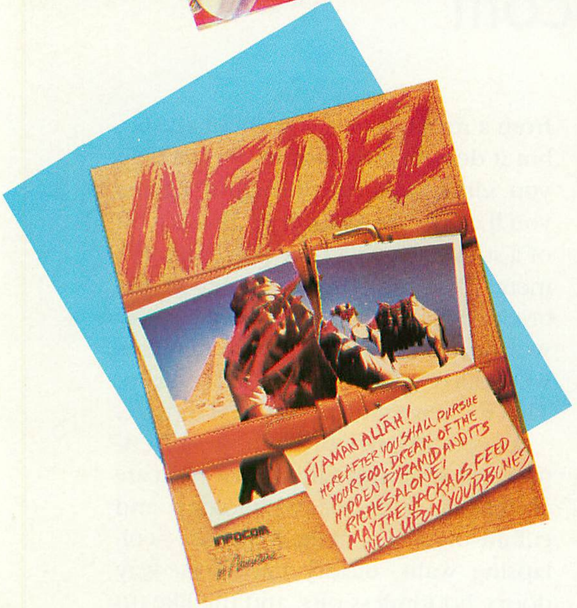
Infidel confronts you with a number of puzzles. You can solve most of them by manipulating objects in your environment and being observant. The program doesn't try to hide information from you (for instance, if there are six exits from a room, it tells you about all six), but it doesn't go out of its way to help you, either. Midway through the game you'll come across a puzzle that is a bit of a stickler. It will force you to experiment. One hint: If you don't get the bricks right the first time, they'll never work properly again, so you might as well RESTORE the game and try again. This will save you a great deal of time.

As you advance through the adventure, watch for traps and puzzles that are consistent with the technology and culture of the Age of the Pyramids—collapsing walls, deadly darts, one-way doors, bottomless pits, and the like (to avoid ruining the game for you, we've

continued on next page







mentioned some traps that aren't actually included in Infidel). If you enjoyed the movie "Raiders of the Lost Ark," you know how to approach this game.

Suspense is very important in Infidel. In one room, for example, there are four exits. Each exit leads into a corridor with a door on the far end. As you walk down the corridor, the door in front of you gradually closes; by the time you reach the door, it is completely shut. Ah, but when you look over your shoulder at the opposite corner of the room, the opposite door is open—until, of course, you walk down *that* corridor.

A NEW KIND OF INVOLVEMENT

When you finish this game, you'll realize that you've been involved in a story that was written by an author who considers it as such. You are not borne off into the sunset on the backs of cheering elves, as in earlier adventure games. Nor do you become the heir to a kingdom, save the human race, or heal the Dark Crystal. Instead, the ending is entirely consistent with the story and its background. It feels right, even if it's not what you're used to in adventure games.

PLANETFALL: A COMEDY ADVENTURE

Planetfall comes in an impressive package that pictures a go-getting soldier against a background of stars. But this interstellar soldier is carrying a mop and bucket: He's been assigned to galactic k.p.!

You've joined the Stellar Patrol to escape the drudgery of farm life. Your primary goal: to avoid the task of cleaning up after all those farm animals. So, you join the Patrol—only to find yourself assigned to clean up the spaceship Feinstein.

Soon, however, an asteroid destroys your ship. As the sole survivor, you manage to land on a nearby planet, which just happens to be inhabited by a robot named Floyd.

Floyd is a bit like an insecure, highly affectionate dog, or perhaps a six-year-old child. He's constantly stumbling into you, knocking things out of your grasp, challenging you to games of "Hider and Seeker," and so on.

Together with Floyd (he won't let you leave him behind), you set off to explore the planet's buildings and corridors, and uncover a mystery about its former inhabitants. There's a lot of ground to cover, so get out a large sheet of paper and start mapping. You'll need the map by the time you're done.

We have mixed feelings about Planetfall. We got the distinct impression that Steve Meretsky, the author, either got tired of tying up loose ends or simply found that the fine game he'd designed didn't fit on a double-sided Atari disk, and had to be cut until it did. As a result, the game includes teleporter booths that lead nowhere, and a helicopter complete with instructions but with a control panel that can't be used.

We could be wrong, but it's always been Infocom's style to include just enough objects to complete a game, and there is an excess of material here. It's possible that Infocom has finally realized that there *should* be some excess material included in an adventure, so that you don't always know which objects need to be used. However, in this case, it doesn't appear that the excess was planned.

Planetfall does include a little gem of writing that saves it from mediocrity, and the game is worth playing just to find it. Other magazines have splashed this magic moment across their covers, thus ruining the game for their readers, but we feel that you should experience it for yourself. We gained a lot of respect for the game's author as a result of this special moment. We're pretty sure that you will too.

Infocom lists Planetfall as its first "Comedy Adventure." To be sure, there's a lot of humor in the game—you're tormented by an awful ensign named Blather—and many of the game's descriptions and responses are wonderful. However, as the author's first effort for Infocom, it is somewhat unsteady, although, clearly, a lot of thinking and work went into it.

Infocom continually produces the best-selling text adventure games. They can be contacted at: 55 Wheeler St., Cambridge, MA 02138. Telephone (617) 492-1031.

*David and Sandy Small are contributing editors to **Antic**. They also have an abiding love of adventure games.*

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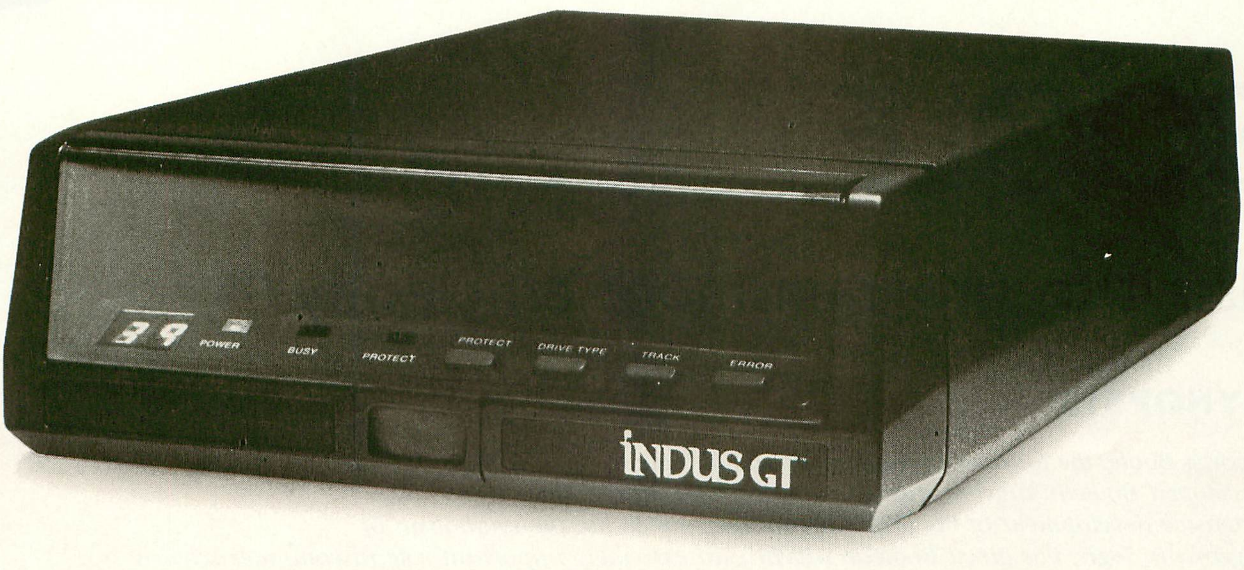
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LOGIC ACCORDING TO



BOOLE

by DONALD B. WILCOX

Use it to program more efficiently

SYNOPSIS

George Boole, the founder of modern symbolic logic, developed Boolean algebra during the mid-19th century. Since then, extensive development of his original concepts, which use the symbolism of algebra in logic, has given Boolean algebra an extremely important role in computer science.

Boolean operations—those that yield true or false results—provide useful programming shortcuts. Use of Boolean operations can make your BASIC programs run faster and occupy less space in memory. Boolean operations also can be used to monitor joystick position, provide screen boundary limits, set flags, select values, and replace successive IF/THEN statements.

READING A JOYSTICK

A joystick can be placed in any one of nine positions, each of which returns a unique value to the BASIC program. The following diagram represents these values. For example, a joystick pushed forward and to the left returns a value of 10, while a neutral joystick returns 15.

A BASIC routine similar to the one below is a common method of reading joystick motion. In the following examples, S is the value returned by the joystick:

```
10 S=STICK(0):IF S=15 THEN 10
20 IF S=7 THEN X=X+1
30 IF S=11 THEN X=X–1
40 IF S=13 THEN Y=Y+1
50 IF S=14 THEN Y=Y–1
60 IF S=6 THEN X=X+1:Y=Y–1
70 IF S=5 THEN X=X+1:Y=Y+1
80 IF S=10 THEN X=X–1:Y=Y–1
90 IF S=9 THEN X=X–1:Y=Y+1
```

In this routine, X represents the horizontal position and Y the vertical position of the character or player on your screen. If we take advantage of the joystick's numbering pattern, we can use Boolean operations to modify the BASIC code.

All movements to the right involve joystick readings that are less than eight. All movements to the left involve values that are greater than eight, but less than 13. Even numbers denote upward motion, and any even number divided by two gives an integer (or whole number). We check for even numbers by comparing the value of a number divided by two with the INTeger function value of the number divided by two.

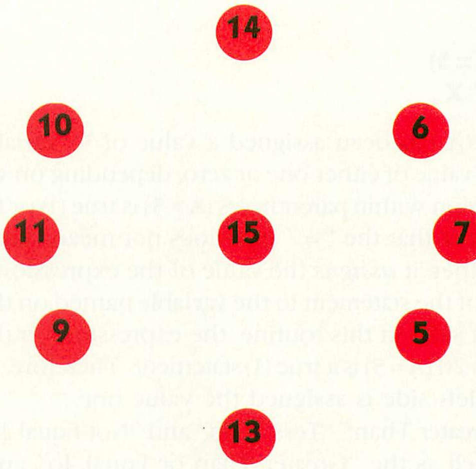


Figure 1.
Joystick position values.

Compare INT(S/2) with S/2. The result of the expression: (S/2 – INT(S/2)) is zero if S is even, and greater than zero if S is odd. If you want to see how the two values compare, type in the following program line and RUN it. Type any number and [RETURN] at the input prompt (?), and the program will print out the two values.

```
0 INPUT S:? INT(S/2),S/2: GOTO 0
```

Note that when the values of downward joystick movements are divided by four, the remainder is always one. You can detect such downward motion with the following BASIC statement:

```
INT(S/4)*4=S–1
```

This statement is only true when the joystick has made a downward motion. To see how these two values compare, type in the following sample program line and RUN it. Type any number and [RETURN] at the input prompt (?), and the program will print out the two values.

```
0 INPUT S:?INT(S/4)*4, S–1:GOTO 0
```

We can summarize these modifications into a new BASIC routine:

```
10 S=STICK(0):IF S=15 THEN 10
20 IF S<8 THEN X=X+1               : REM JOYSTICK
                                     PUSHED RIGHT
30 IF S>8 AND S<13 THEN X=X–1      : REM JOYSTICK
                                     PUSHED LEFT
40 IF INT(S/2)=S/2 THEN Y=Y–1      : REM JOYSTICK
                                     PUSHED FORWARD
50 IF INT(S/4)*4=S–1 THEN Y=Y+1    : REM JOYSTICK
                                     PULLED BACK
```

BASIC assigns a value of one to an expression which is logically true. A zero is assigned to logically false statements. Consider the following statements:

continued on next page

```
10 A=5
20 X=(A=5)
30 PRINT X
```

Variable A has been assigned a value of 5. Variable X is assigned a value of either one or zero, depending on whether the expression within parentheses (A = 5) is true (1) or false (0).

Remember that the "=" sign does not mean "equals" in BASIC. Rather, it *assigns* the value of the expression on the right side of the statement to the variable named on the statement's left side. In this routine, the expression on the right side of line 20 (A = 5) is a true (1) statement. Therefore, variable X on the left side is assigned the value one.

The "Greater Than," "Less Than" and "Not Equal To" symbols, as well as the "Greater Than or Equal To" and "Less Than or Equal To" symbols, can also be used in Boolean operations.

Change the BASIC code as follows:

```
10 A=5
20 X=(A=2)
30 PRINT X
```

Variable X is assigned the value zero because the expression (A = 2) is false. Variable A was assigned the value five in line 10. How does the computer recognize that line 10 is an assignment for A, and line 20 is a check on the truth or falsity of the expression in parentheses? The format in line 20 is standard for this type of Boolean operation. The variable on the left side of the statement is assigned the logical value (true (1) or false (0)) of the expression in parenthesis on the right side of the statement.

These statements would monitor joystick movements to the right:

```
10 S=STICK(0):IF S=15 THEN 10
20 X=X+(S<8)
```

The value (S<8) in line 20 is either one or zero, depending on the position of the joystick. If the joystick is pressed to the right (S = 5, 6 or 7; see Fig. 1), the value of (S<8) will be one; otherwise, it will be zero. If (S<8) is a true statement, the value of X will be increased by one. If (S<8) is false, X will not change.

Let's rewrite our original BASIC routine using these additional Boolean techniques:

```
10 S=STICK(0):IF S=15 THEN 10
20 X=X+(S<8)-(S>8 AND S<13)
30 Y=Y+(INT(S/4)*4=S-1)-(INT(S/2)=S/2)
```

Line 20 increments X if the value of S is less than eight (joystick is pushed to the right), and decrements X if S is greater than eight, but less than 13 (joystick is pushed to the left). Similarly, line 30 decrements Y when S is equal to an even number (joystick is pushed forward), and increments Y when S is divisible by four with a remainder of one (joystick is pulled downward).

Note that the BASIC routine remains at line 10 until the joystick is moved away from the center position. Reassign S after each move in your program, because S will retain the value of the last move until it is reset to 15. This is an additional purpose of line 10.

CHECKING BOUNDARIES

This brings us to a second situation: the handling of screen boundaries to prevent the cursor from going out of bounds. First, we must determine the size, or grid coordinates of the screen. These limits vary with the graphics mode chosen. Graphics Mode 3 has 40 columns (numbered 0 to 39) and 20 rows. Thus, if X represents the horizontal position of the cursor, X must be greater than or equal to zero and less than 39 for the cursor to remain in bounds. If Y represents the cursor's vertical position, Y must be greater than or equal to zero and less than 19.

Other graphics modes have different grid sizes. See the inside back page of your *BASIC Reference Manual* for the grid limits of your screen.

Let's begin with a simple example. Consider the following BASIC routine, written for Graphics Mode 3, which prevents the cursor from moving off the right side of the screen:

```
10 S=STICK(0):IF S=15 THEN 10
20 X= X+(S<8) * (X<39)
```

If the joystick is pressed to the right, the Boolean expression (S<8) is true and is assigned a value of one. If X, the horizontal position of a point on the screen, is less than 39, the value of (X<39) is true, and also is assigned a value of one. In this situation, X is incremented by one, the product of the two Boolean values. When X is greater than or equal to 39, the Boolean expression (X<39) is false, and is assigned a value of zero.

Similarly, when S is greater than or equal to eight, the Boolean expression (S<8) is false, and also is assigned a value of zero. Since X is incremented by the product of these two Boolean values, X will be left unchanged if either value is zero. For example, if (S<8) is true and (X<39) is false, the computer evaluates line 20 as follows:

```
X=X+(1)*(0) [or]
X=X+0 [i.e. no change in X.]
```

We can apply the same logic to the truth or falsity of (S>8 and S<13) * (X>1) to prevent the cursor from moving off the left side of the screen. Similarly, line 30 controls the screen's upper and lower boundaries as Y is changed.

Not only can we rewrite our original joystick-controlled program to move a spot on the screen, but now we can also prevent the cursor from exceeding the screen's boundaries with the following routine:

```
10 S=STICK(0):IF S=15 THEN 10
20 X=X+(S<8) * (X<39)-(S>8 AND S<13) * (X>0)
30 Y=Y+(INT(S/4)*4=S-1) * (Y<19)-(INT(S/2)=S/2)-
   (Y>0))
```

continued on page 52

Line 20 increments and decrements X, and keeps the cursor from moving off the right or left edges of the screen. Line 30 increments and decrements Y, and keeps the cursor from moving past the screen's top or bottom edges.

SETTING FLAGS

Use a routine similar to this one to allow a user to print information from your program:

```
10 DIM A$(1)
20 PRINT "DO YOU WANT TO USE THE PRINTER?"
30 PRINT "ANSWER Y OR N."
40 INPUT A$
50 IF A$="Y" THEN PRINTER=1
60 IF A$="N" THEN PRINTER=0
```

This program also can be written using a Boolean approach. Simply change the lines shown below. The program's other lines remain the same.

```
50 PRINTER=(A$="Y")
60 deleted
```

If the user's response is "Y," the value of PRINTER will be one. If the response is "N," PRINTER will be equal to zero. You can also use a Boolean approach to read the red joystick button:

```
10 BUTTON=(STRIG(0)=0)
```


When the button is pressed, the variable BUTTON will have the value one; otherwise, it will have the value zero.

SELECTING A VALUE

We can use a series of IF/THEN statements to select the value of one variable based on the value of another. This is illustrated in the following routine:

```
10 IF P=5 THEN X=1
20 IF P=11 THEN X=2
30 IF P=13 THEN X=7
```

Note that these instructions can be compressed into one line using a Boolean approach:

```
10 X=(P=5) + 2*(P=11) + 7*(P=13)
```

If P=5, the expression would be equal to: (1+2*(0)+7*(0)), or one.

If P=11, the expression would be equal to: (0+2*(1)+7*(0)), or two.

If P=13, the expression would be equal to: (0+2*(0)+7*(1)), or seven.

And if P were equal to any other value, the expression would be equal to: (0+2*(0)+7*(0)), or zero.

REPLACING IF/THEN STATEMENTS

We'll use the same approach to replace IF/THEN statements. Begin with this code:

```
10 IF P=1 THEN GOTO 100
20 IF P=3 THEN GOTO 200
30 IF P=7 THEN GOTO 300
40 IF P=11 THEN GOTO 400
50 IF P=13 THEN GOTO 500
60 IF P=17 THEN GOTO 600
```

Compare this routine with the following routine using Boolean operations:

```
10 K=(P=1)+2*(P=3)+3*(P=7)+
   4*(P=11)+5*(P=13)+6*(P=17)
20 ON K GOTO 100, 200, 300, 400, 500, 600
```

For example, if P=11, K would be equal to: (0) + 2*(0) + 3*(0) + 4*(1) + 5*(0) + 6*(0), or four.

Line 20 would then branch to line 400. Note that when K=0, the computer ignores line 20 and drops to the next line.

With practice, you'll discover many creative ways to use Boolean operators to enhance your own code. (You have to pay for these enhancements, though; the resulting code is much more difficult to debug. If you're having difficulty, let the computer help you. You can always print out intermediate results, try shorter statements and experiment. —ANTIC ED)

Donald B. Wilcox is an Assistant Professor in the Accounting Information Systems Department at the University of Wisconsin (Milwaukee). He's a member of the Milwaukee Atari Users' Group, and owns four Atari computers. Donald is currently doing consulting work on a project that uses a single Atari 800 to monitor and control 30,000 remote devices.

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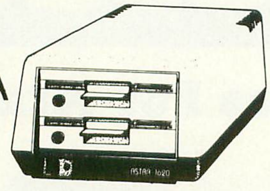
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APROM and SIX PACK

Walling Co.
775 E. Evans
Scottsdale, AZ 85260
(602) 998-7550
$99.50, Aprom Cartridge
$44.95, Six Pack

Reviewed by Larry Dziegielewski

A new program-storage product for the Atari 800 will make life at the keyboard much easier. **Aprom** is a cartridge-based EPROM (Erasable Programmable Read-Only Memory) programmer that fits into the right cartridge slot of the Atari 800. It allows you to create your own cartridge-based software. When used with the **Six Pack**, another program-storage cartridge, you can access up to 48K of programs in only 8K of RAM space.

Aprom can access either 2764 (8K) or 27128 (16K) EPROM's in the right cartridge slot of the Atari 800. Aprom comes with the GP (general purpose EPROM programmer), and a "wedge" that adds commands to the BASIC or Assembler cartridge. With the GP program in control, it is possible to read, program, verify and erase EPROM's. GP also includes the PARAM command (PArallel RAM), which disables the Aprom cartridge and "hides" it from the Atari Operating System. Aprom disappears when PARAM is selected, and the 8K block of RAM normally used by Aprom becomes free RAM. A POKE from BASIC or Assembler returns control back to the Aprom cartridge.

The Aprom also includes the Aprom Operating System command mode. When AOS is booted from disk and then written to the EPROM with the "Write/OS" command, Aprom becomes a self-booting cartridge. AOS has its own set of commands, including some found under GP and its own "RUNU" (run utility) command. RUNU is used to select an 8K block of programs residing on the Six Pack cartridge. AOS gives the user the ability to store, list and execute programs on an EPROM.

The Six Pack cartridge is an EPROM board with three sockets in which 2764 or 27128 EPROMS can be mounted. As a result, BASIC, Assembler and PAC-MAN programs can be available with a simple two-key command, without the need to switch cartridges. This cartridge is used in the Atari 800's left slot and gives the user access to 48K of program storage, switchable in 8K blocks. (The full 48K is available only when three 27128 EPROMS are installed on the Six Pack.) The Six Pack enables users to keep programs that normally reside in the left-cartridge address space on the Six Pack, calling the programs in as needed.

Six Pack can be used in any Atari machine, with or without Aprom. When used with the Aprom AOS, it can call 8K programs with the RUNU command. Blocks available from AOS are labeled "A" through "F." A "RUNU C" command, for example, will cold start the computer and select the program in block C of the cartridge.

Aprom and Six Pack are gems, and I highly recommend them for work that involves jumping back and forth between the Assembler cartridge program and a debugger.

PANZER-JAGD

Avalon Hill
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300
$30.00, 48K — disk
$25.00, 32K — cassette

Reviewed by Edward Bever

"Panzer-jagd" means "tank hunt" in German, and that's what Avalon Hill's game **Panzer-Jagd** simulates. As commander of a German battle group, you lead 50 or more tanks, organized into platoons of five and often supported by infantry and artillery, in typical offensive operations. The computer controls the defending Russians, and skillfully deploys them into a series of defensive positions concealed in the wooded countryside. Your forces can find the Russians only by exposing themselves to enemy fire, so you must maneuver carefully to minimize your own losses.

The German force includes a mixture of obsolescent Mark III light tanks and state-of-the-art Panthers, probably the best fighting machines of the war. Opposed to them are numerous weak anti-tank guns and profuse T-34/85s, the only tanks in the world that could fight the Panthers on roughly equal terms.

The program contains two scenarios. In the first you assemble and lead a mixed group of tanks to secure the flank of a larger offensive. In the second you command a force of tanks and infantry

continued on next page

product reviews

supported by field artillery in a diversionary attack designed to draw enemy strength away from a German offensive elsewhere by driving as deeply into Russian lines as possible.

Panzer-Jagd is suitable for both novice and veteran players. Although the graphics are on the dull side and the BASIC is a bit sluggish, the program is easy to operate, and the game is well structured and simple to learn. Playing well, however, requires concentration and practice, and the experience is a credible re-creation of armored tactics on the Eastern Front.

EXODUS: ULTIMA III

Origin Systems, Inc.
P.O. Box 99
1545 Osgood St. #7
North Andover, MA 01845
(617) 681-0609
$59.95, 48K — disk

Reviewed by Chris Chabris

You must discover and defeat a mysterious cause of great evil in this fantasy adventure game. Created by Lord British (Richard Garriot), this successor to **Ultima II** features scrolling wilderness and city maps, 3-D dungeon views, monsters, and magic spells. In these respects, it resembles its predecessor.

However, in the interests of a better plot and multi-player capacity, several frills have been eliminated.

Also in a radical departure from past procedure, as many as four characters can go adventuring together.

Each character may be "forged" from one of five races and eleven professions—a good mix is needed to complete the adventure.

During a session of play, the party of characters wanders around the continental map, exploring sites, obtaining clues, fighting monsters, and, of course, taking treasure. The puzzle-solving aspects of Ultima III resemble a text adventure more than a "hack and slay" fantasy game. Virtually all of the game's elements must be used to win. Surprises continue to appear, even near the end of the quest.

This is a well-crafted program featuring animated figures, polyphonic background music, game save, (an essential function), and magical gates. It is one of the few programs on the market complemented by documentation, including an introductory "Book of Play" and gazetteer, two tomes of magic spells, and a command reference card. All are excellently written and add to the game's atmosphere.

However, the Atari translation by Chuckles (Charles Bueche) is disappointing. All colors are produced through artifacts, restricting the display to white, black, red, and green. Although most objects are animated, the animation slows down when the player

The puzzle-solving aspects of Ultima III resemble a text adventure more than a "hack and slay" fantasy game.

is typing a command. No Player/Missile Graphics were used and sound effects do not fully utilize the power of the Atari. The dungeon graphics are low resolution and poorly colored, and the character set is hard to read.

Exodus: Ultima III is an excellent and engrossing adventure, but the graphic execution could be better. If you expect every game you play to stretch the graphics potential of your Atari, be prepared for a possible letdown. However, if you enjoy fantasy role-playing games, this program will not disappoint you.

SAFETYLINE

Maximus, Inc.
6723 Whittier Ave.
McLean, VA 22101
(800) 368-2152
$39.95, 48K —
requires cassette and disk

Reviewed by Rhonda Holmes



Safetyline is a flashy presentation starring Max the Cat in two movies and four games that teach youngsters ages three to seven how to cross the street safely and what to do if they get lost. The two games that follow each movie exercise the "Safety Tips" outlined in the movies.

I tested this game on 25 children aged two through seven at a Montessori school. The children, even the youngest, instantly took to the bright graphics and bouncy music of the first movie, in which Max introduces a little boy named Sam. Max, Sam's invisible friend, helps him cross the street to get to school. In the second movie, Sam gets lost at the zoo and Max helps him find his way back to his teacher.

In the first game, "Streetcross," you must help Sam get to school safely. In the next game, "Hidden Tips," you have to find a word from the "Safety Tips" in a word-search puzzle. This word is prominently displayed at the top of the screen. Children who know their alphabet but cannot yet read can play this game, as it involves finding letters in the correct order within a puzzle.

"Tipmatch" is designed for one or two players who can read. You are given eight squares; within each square is a

statement about safety. If you find four matching squares, you win!

By the count of "oohs" and "ahhs" in the classroom, "Zoomaze" was Safetyline's most popular game. To play, you have to help Sam through a maze whose walls appear only after you bump into them. At the four corners of the screen are boxes; one contains the teacher, two contain other familiar faces (those of a police officer and a store owner), and the last contains a stranger. If you find the stranger, you lose.

Two- and three-year-olds had some coordination problems and trouble understanding the correlation between the joystick and the computer. However, I believe that, with practice, three-year-olds can play the games that don't involve reading.

The four- and five-year-olds, many of

Safetyline is an excellent introduction to the computer: it's fun, and the games are easy to play.

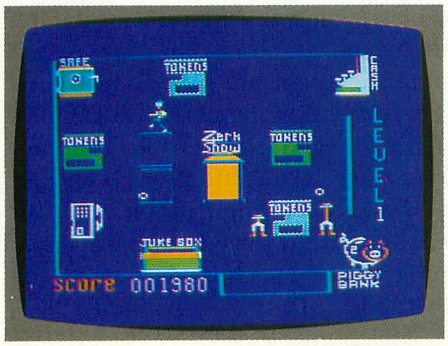
whom already could read, remembered the "Safety Tips" when questioned and enjoyed playing the games. The six- and seven-year-olds understood the importance of taking safety precautions and played the games very well.

This product is an excellent introduction to the computer: it's fun, and the games are easy to play. Most importantly, they teach children vitally important lessons about safety.

SPARE CHANGE

Broderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
$34.95, 48K — disk

Reviewed by Keith Valenza



If you're looking for a humorous arcade game in the tradition of Mappy or Domino Man, Broderbund's **Spare Change** fits the bill.

Here's the scenario: You are the owner of the Spare Change video arcade. Two of the characters from your newest game have escaped and are trying to save enough tokens in their piggy bank to retire. If they succeed in depositing five tokens in the bank, the game is over.

Your task is to stop these characters—called Zerks—by collecting tokens for yourself. One way is to steal them from the Zerks: they will get angry and stomp up and down—one of the game's many amusing touches.

You can also distract them: put a token into the jukebox and watch the Zerks dance for a few seconds while you collect your tokens. Their imitation of Fred Astaire and Ginger Rogers might not win first prize on "Dance Fever," but it will make you laugh.

If you collect ten tokens before the Zerks get their five you progress to a higher level. You can then empty the Zerks' piggybank by entering the Zerk Cartoon Show booth. Here you're treated to one of several brief cartoon intermissions, reminiscent of the interludes between levels on Ms. Pac-Man.

However, Spare Change does have its flaws. Poor graphics is one of them. The Zerks aren't very detailed; they just don't look enough like arcade characters.

Another potential problem: advancing to the higher levels happens slowly. However, the authors included a feature rarely seen in arcade games—the ability to adjust the difficulty level by changing several combinations of variables.

In spite of some of the game's problems, the authors worked hard to make this game as "arcade-like" as possible. The demo mode features a brief Zerk cartoon, followed by a demonstration of the game. At the game's conclusion, a screen with the top five scores which the scorers can initial are displayed. However, scores could not be saved on the disk.

Like many of the computer arcade games that preceded it, Spare Change is challenging, with fast-action. The game is non-violent and just plain zany fun.

BASIC BUILDING BLOCKS

Micro Education Corp. of America
285 Riverside Ave.
Westport, CT 06880
(203) 222-1000
$79.95, 48K — disk

Reviewed by George Adamson

BASIC Building Blocks turns your computer into a teaching machine straight from a science fiction fantasy with its interactive and stimulating computer-assisted instruction.

People buy computers for a variety of reasons, but sooner or later they want to know how to program. BASIC Building Blocks can help; it is a useful tutorial for the whole family as either an introductory or remedial course in programming. The program is also suitable for classroom-type seminars.

Unlike a book, BBB gives immediate feedback and reinforcement to the

continued on next page

product reviews

learner. (*This is the aspect of computer-assisted instruction which is so important.* —ANTIC ED) The program reviews the user's progress by asking multiple choice questions. You cannot proceed to more difficult concepts until you correctly answer the earlier queries.

As you progress through the lessons, which range from "Introducing BASIC," to "Arrays," to "Strings," and more, you'll practice about 60 BASIC programs. These calculate things such as gas mileage, temperature conversions and grade averaging. At the end of each chapter, you're given a simple problem and are encouraged to solve it with the BASIC programming techniques you've just learned.

The program comes on two disks with the introductory material on the first and the more difficult lessons on the second. One of the useful features of the program is that you can skip directly to the example. The Disk chapter even permits a secret password number to be inserted and then correctly input later to run a program. The last two chapters on "Sticks and Sounds" and "Graphics" are specifically written for Atari's capabilities.

> It is a useful tutorial for the whole family as either an introductory or remedial course in programming.

A few minor deficiencies should be noted: the documentation contains several misspellings, not acceptable in an educational program. The tutorial treats the POKE command very superficially. Additionally, BBB is not compatible with BASIC XL from OSS. It is compatible, however, with all XL series including revision B of Atari BASIC; included on the second disk is the "BASIC Design Tool".

BBB's exclusive "Basic Design Tool" is like a window into the computer, allowing you to watch a program execute line by line. But, the "BASIC Design Tool" can also be used as a "stand-alone" to trace and debug any programs with its variable, statement, and stack windows. BDT uses 12K of RAM and does not interfere with BASIC programs. (The documentation says it does move the BASIC screen address.)

Combining a tutorial and a debugging tool into one package makes BASIC Building Blocks a genuine good deal which you can use long after you master the lessons. (*MECA has done a good job, and we encourage our readers to let them know. A lot of their current effort is aimed at the IBM and Apple market. Let them know you are Atari owners and you'd like to see more.* —ANTIC ED)

810 TURBO

Neanderthal Computer Things (NCT)
P.O. Box 16489
Irvine, CA 92713
(714) 770-0372
$195.00

Reviewed by David Duberman

If you've owned your Atari 810 disk drive for a while, you've probably "bumped your head" at least once on its limited storage capacity. The standard 810 only holds about 90K of data per side (180K total), much less than similar drives for other home computers. Well, here's some good news: Neanderthal Computer Things' **810 Turbo** offers you a way to increase your system's storage capacity without incurring the expense of a new drive.

When installed in an 810 drive, the 810 Turbo circuit board provides true double-density storage, thus doubling the capacity of each disk side to about 180K. The installation instructions for the board are so clear and explicit that even novices should have no trouble following them. Many illustrative

product reviews

photos are included, and no soldering is necessary. However, you must make sure that your drive's head is clean, and that the drive mechanism is in good working order, because double-density operation is much more sensitive than single-density.

The Turbo also lets you use Mach DOS, which is included with the circuit board. Mach DOS speeds data transfer to about four times its normal rate (which makes it comparable to Happy Computing's **Warp Speed**). Programmers, who often load and save programs many times before they're complete, will find that this feature saves a significant amount of program development time. They'll also save time going back and forth between DOS and the programming language in use. In addition, because the Turbo uses track buffering, it permits faster data transfer even without Mach DOS.

Another special feature of the 810 Turbo is its ability to disable write protection. This feature can be controlled by Mach DOS, and lets you use the back sides of disks without having to notch them. There is no provision, however, for the write protection of notched disks.

The 810 Turbo automatically recognizes the density of the first disk inserted into it after it's turned on, and configures itself accordingly. However, application programs that use a DOS disk format and directory, such as DataSoft's **Text Wizard**, can use double-density storage for data files. In fact, the Turbo's documentation includes specific instructions for just such situations.

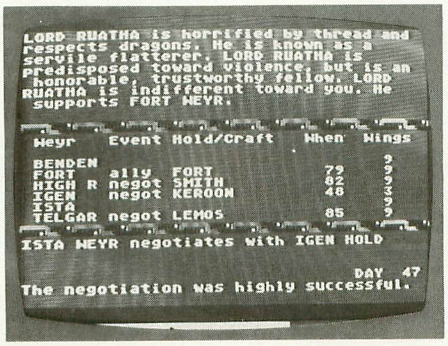
Mach DOS has several other useful features. When you read the directory of a disk whose density is opposite that of the last disk read, Mach DOS automatically switches the density mode and displays the density modes of all drives in the system. You also can use special options on the Mach DOS menu to switch density, turn write verification on and off, switch the default drive (the one addressed by "D:") to a drive other than Drive 1, and convert files between densities.

At $195, the Turbo 810 costs much less than a new double-density drive. It works and it's a good value.

DRAGONRIDERS OF PERN

Epyx
1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700
$39.95, 48K — disk

Reviewed by Ellen Keyt



Dragonriders of Pern, based on the novels by Anne McCaffrey, is an unusual and intriguing strategy/action game. Set on the planet Pern, the game centers around the periodic fall of a deadly rain of silver thread, presaged by the appearance of the Red Star. Pern's human population inhabits holds and Weyrs, strongholds in which commerce, industry, and dragon-raising take place. As the representative of an important Weyr, your twofold task is to win the confidence of the other holds and Weyrs through negotiation, and to defend the planet from the falling silver thread by riding dragons whose fiery breath burns it.

Dragonriders of Pern is a winner. Its 16th century music transports you back to medieval times. A dragon soars across the screen in time to the music. You can choose a game with or without thread fighting, and select the game's speed and length. There are two stages of play: negotiating and thread fighting. After negotiating, you can save the game to disk to finish later.

In the negotiating stage of the game, you try to persuade Pernesians that your plans for the future of Pern are sound. You'll meet many different characters, each with a distinct personality. Negotiation is difficult because you can't foretell exactly how a Pernesian will react to your approaches. You may negotiate well and still be denied the political alliance you seek. Sometimes, if a Lord persists in refusing an alliance, you must resort to a duel.

In the thread-fighting sequence, you battle silver threads from the back of your dragon. In level 1, you fly in two dimensions. Levels 2 and 3 are more challenging because you have to fly your dragon in a three dimensional playfield. Learning to maneuver the dragon isn't easy, as you can only rotate a quarter of a turn at a time. However, once you get the hang of steering, flying your dragon is a breeze.

Dragonriders of Pern is a challenging game. You can assume different types of behavior when negotiating with Pernesians, so the game is never the same. The thread-fighting sequence is very realistic. This is a satisfying game for anyone who likes adventures. Now, if you will excuse me, I have a negotiation meeting to attend . . .

SUCCESS WITH MATH

CBS Software
1 Fawcett Place
Greenwich, CT 06836
(203) 622-2670
$24.95, diskette
$19.95, cassette

Reviewed by John and Mary Harrison

Success With Math is billed as a "comprehensive, self-paced math tutorial." The first two packages cover the basic operations of addition, subtraction, multiplication, and division with whole

continued on page 62

new products

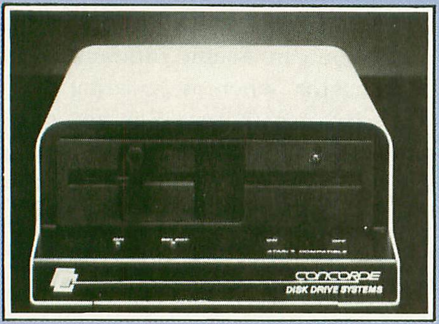
BRUCE LEE

(game)
Datasoft, Inc.
19808 Nordhoff Place
Chatsworth, CA 91311
(818) 701-5161
48K—diskette/tape (game package)
$34.95

If you've ever wondered what it would be like to have the fast fists and reflexes of Bruce Lee, this action/strategy game will give you a good idea. As Bruce Lee, you must use all of your combative and strategic powers to get inside the forbodding fortress of the Evil Wizard and capture his hidden treasure. Danger faces you at all turns.

C-221M and C-221S

(disk drives)
Concorde Peripheral Systems
23152 Verdugo Drive
Laguna Hills, CA 92653
(714) 859-2850
C-221M — $369.00
C-221S — $269.00



Concorde Peripheral Systems is introducing a totally new concept for Atari-compatible drives—a master disk drive unit and up to three slave drives. The Atari disk-operating system—single and double density—is included with every Concorde drive unit, at no extra cost. The series uses sleek metal cases, simplified, easy-to-use controls and LEDs on the front panel to indicate essential data. The C-221M and C-221S are smaller than other models, giving the user more available workspace. A unique one-year warranty includes a simple over-the-counter exchange program. If the unit malfunctions, the user returns the drive to his dealer, shows him his receipt and gets a new drive at no charge.

Return the favor. When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future. —ANTIC ED

PACK IT/CHAIN IT

(utilities)
Superware
2028 Kingshouse Road
Silver Spring, MD 20904
(301) 236-4459
Pack It: 32K—diskette—$19.95
Chain It: 32K—diskette—$19.95

Pack It lets you store an 8,000-byte picture in only 2,000 bytes. It can take any large data file and reduce its size. Its two machine-language programs let you pack any file down into a smaller file and then enter a subroutine into a BASIC program that will load and unpack it. **Chain It** lets you write large programs in BASIC and pass data from program to program. You can break big programs into smaller segments and transfer string and variable array data from one to the other in RAM, rather than with a disk file.

RELAX

(application)
Synapse Software
5221 Central Ave.
Richmond, CA 94804
(415) 527-7751
16K—diskette and cassette
$139.95

Relax, a stress reduction system designed for use with your Atari, uses biosensory technology to help you monitor and reduce stress. This hardware/software package represents muscle tension graphically on your monitor; a sensor headband is used to measure muscle tension. A workbook helps you understand your reactions to stress and suggests ways to change them, and an audio tape guides you into deep relaxation.

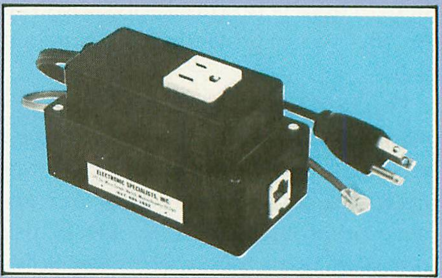
DISKETTE HEAD CLEANING KIT

(cleaning package)
Nortronics Company, Inc.
8101 Tenth Ave. North
Minneapolis, MN 55427
(612) 540-8674
$39.95
Program Diskette alone — $29.95

Diskette Head Cleaning Kit takes the guesswork out of maintaining disk drive heads. When you boot up the unique software—the **Program Diskette**—step-by-step instructions appear, instructing you how to clean your disk drive and how to prepare a separate cleaning disk. Other items in the kit include two cleaning diskettes, a reusable diskette jacket, head cleaning spray and instructions. The Program Diskette is also available separately, and can be used with any diskette head cleaning kit.

MODEL PDS-11/SUP

(surge protector)
Electronic Specialists, Inc.
171 So. Main St.
Natick, MA 01760
(617) 655-1532
$81.95



Intended to suppress damaging telephone and power-line spikes caused by lightning, spherics or office-phone switch gear, the KLEEN SECURITY system uses modern semi-conductor, Metal Oxide Varistor and Gas Discharge Tube suppression techniques. Models are available for standard 4-pin and 8-pin telephone modular connectors. Pictured is **Model PDS-11/SUP** which has suppression on red and green phone lines (pins 3 and 4), with yellow and black lines brought straight through. A 6500 Amp suppressor protects the AC power line. Standard modular 4-pin telephone connectors provide simple, trouble-free hook-up.

new products

F CABLE

(cable connector)
Anchor Automation, Inc.
6913 Valjean Ave.
Van Nuys, CA 91406
(818) 997-6493
$39.95

Anchor Automation, the makers of Volksmodem, now make it possible for you to direct-connect their modem to any Atari computer, *without* using an Atari Model 850 Interface Unit. The new **F-Cable** package contains an adapter cable, one software tape cassette, one six-foot telephone cable and all the electronics needed.

HOW TO OPERATE THE ATARI 600XL AND 800XL HOME COMPUTER

(educational program)
Fliptrack Learning Systems
999 Main, Suite 200
Glen Ellyn, IL 60137
(800) 222-FLIP
$19.95



With this audio-cassette tutorial, users listen to the tape, follow the instructions and get immediate results. One spoken-voice audio cassette and one data cassette teach start-up procedures (including those for the Atari 1010 recorder). Additional instruction introduces the keyboard, BASIC programming skills and the Atari's color, sound, graphics and mathematical capabilities. A flip of the tape, at various stages of the lesson, allows the learner to pursue optional special-interest topics or get extra practice. The self-paced instructional aid operates on any standard cassette player, and requires no computer hookup.

New Products notices are compiled by the **Antic** staff from information provided by the products' manufacturers. Antic welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.

QUANTERM

(terminal software and modem)
Quantum Microsystems, Inc.
P.O. Box 179
Liverpool, NY 13088
(315) 451-7747
modem with disk software — $169.00
modem with ROM cartridge — $199.00

This complete telecommunication system for all Atari computers contains a direct-connect, auto-dial, auto-answer modem and full-featured terminal software. The modem connects to the Atari serial bus and does not need an interface module or power connection. The easy-to-use software includes many interactive functions: auto-dial phone directory, up-load and down-load editor, file transfer protocols for Xmodem and CompuServe, macro commands from keyboard or file, auto-answer message system, and more. The modem also works with most existing software intended for use with the Atari 850 interface.

VISUALIZER

(graphics package)
Maximus, Inc.
6723 Whittier Ave.
McLean, VA 22101
(800) 368-2152
In VA — (703) 734-4200
48K — diskette — $49.95
Audio option — $39.95

The multi-talented **Visualizer** is not only a low-cost method of originating color-animated graphics and text—it can also turn your Atari computer into a full-featured slide projector. With the audio option and an Atari 410 or 1010 recorder, pre-recorded narration or an audio tape can be synchronized with a graphics presentation. In addition, electronic black and white hard copy can be produced with any Atari-compatible printer.

MICRO ILLUSTRATOR

(graphics program)
Tech Sketch Inc.
c/o Ampower Technologies, Inc.
26 Just Road
Fairfield, NJ 07006
(800) 526-2514
48K — diskette
with LP-10 Light Pen — $69.95
without Light Pen — $39.95

Micro Illustrator transforms any color television into a canvas and a palette, while the **LP-10** or **LP-15 Light Pen** acts as a video paint brush. Three available menus offer the artist a myriad of colors, shapes, modes and patterns from which to choose.

MICRORAM 64K MEMORY BOARD

(RAM expansion)
Microbits Peripheral Products
225 W. Third St.
Albany, OR 97321
(503) 967-9075
$149.95

The first 64K expansion board for the 600XL, **Microram** allows you to run any 800XL software. It gives your 600XL memory to run word processing programs, spreadsheets and database programs. All you do is plug the board into the parallel bus connection on the back of the computer.

STICKYBEAR BOP and STICKYBEAR BASKETBOUNCE

(games)
Weekly Reader Family Software
245 Long Hill Road
Middletown, CT 06457
(203) 347-7251
48K — diskette — $39.95 each

Said to feature excellent graphics, these two games of skill and strategy star a full-color, animated bruin named Stickybear, who fosters the enjoyment of microcomputing in children while challenging the gaming abilities of adults. **Stickybear Bop** is a shooting gallery that calls for the player to knock down bears, planets, ducks and balloons as they whiz by. In **Stickybear Basketbounce**, the player must be quick to catch falling stars, bricks and donuts without getting clunked on the head.

product reviews

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numbers. The last two explore fundamental topics in algebra: solving linear and quadratic equations. The educator who created this made sure they were classroom tested; this alone makes the programs unusual.

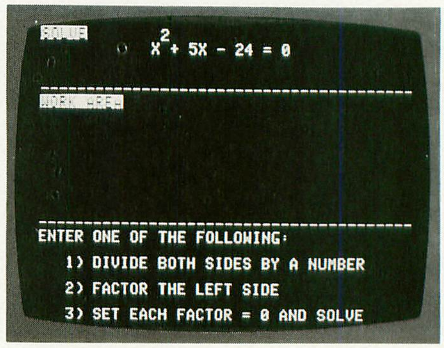
In each of the four packages, you select the number and type of problem on which you want to work. The program keeps track of the errors and gives a summary at the end of each problem.

Each program comes with a short instruction manual that briefly explains how to load and use the program by following an example step-by-step. The directions are also included in the program—you can display them by pressing the [H] key.

The packages for primary school students (addition, subtraction, multiplication, and division) are drill-and-practice rather than tutorial programs. When a child errs, the correct answer is shown without the explanation one expects from a tutorial. These two programs are also visually drab: white text on a black screen with no color or sound. Other programs that cover these topics are just as technically correct, yet present a more visually exciting package.

However, the two algebra packages, directed toward older students, are well-written tutorials. Although their presentation offers no more visual interest than the previous packages, the purpose of the programs is different and their starkness is less obvious. With the algebra packages, the program explains and guides the student to the correct solution when an error is made. Thus, the student is eased into learning while practicing effective techniques for solving simple equations.

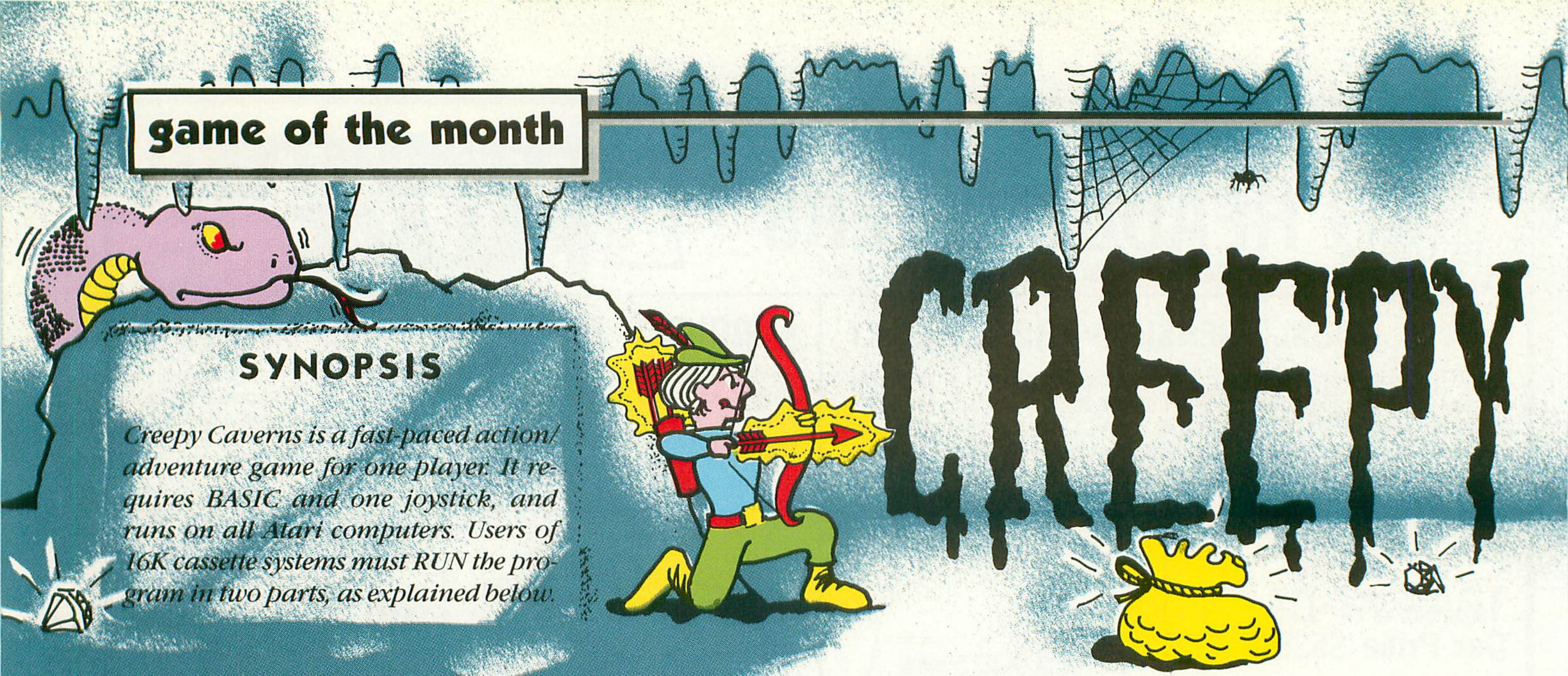
There are a few relatively minor complaints we have to make about the packages. Only on the disk itself is it stated that the programs require BASIC to run; this should be clear from the documentation. The BREAK key is not disabled; this simple procedure can eliminate the frustration encountered with a misplaced keystroke. The on-screen instructions are long and boring to read. There should be more interaction between the student and computer if for no other reason than to guarantee attention. Finally, as mentioned *before, none* of the programs make use of the computer's graphics capacities. It is a shame that the author did not vary the screen colors to reflect different difficulty levels or at least to reduce the eyestrain that



comes from staring at a black screen.

On the positive side, the programs are technically sound and bug-free. They always encourage and never criticize the student, even after several mistakes. Best of all, CBS recognizes the right of the consumer to create archival copies of the software. The packages are not copy protected so you are free to make back-up copies. Although we cannot get overly excited about another set of drill and practice arithmetic programs, we feel the algebra tutorials are well done, accomplish their goals and are worthy of consideration.

Note: The algebra packages will not run on the Atari 400. The addition and subtraction packages for the 400 require 16K. All other packages run on all other Ataris and require 32K.



CREEPY

SYNOPSIS

Creepy Caverns is a fast-paced action/adventure game for one player. It requires BASIC and one joystick, and runs on all Atari computers. Users of 16K cassette systems must RUN the program in two parts, as explained below.

Warning: This is not a game for the claustrophobic! An evil creature, the Megawump, has rounded up a horde of bloodthirsty monsters who roam the countryside at night, raiding small villages and hoarding their ill-gotten treasures in the musty caverns they inhabit. Your task is to enter these caverns, retrieve as much treasure as you can, and collect the magic objects needed to kill the Megawump. You'll find two monsters in every room. They come in three varieties: pythons, trolls and hydras. Each is more vicious than the last, and each is worth 1000 points dead.

To succeed in your quest, you must avoid these monsters, and pick up bags of gold (worth 50 points) and jewels (80 points) from their caverns. The caverns also contain quivers of arrows. Each red quiver contains five "smart" arrows. These arrows, which are also red, guide themselves to the nearest monster when fired. Orange quivers hold five "dumb" arrows, which fly straight, and thus must be aimed more carefully.

Other magic items that are hidden in the caverns include a gold amulet, which protects you from the Megawump's lightning bolts, and a gold key that opens a magic chest. By opening the chest, you gain the magic sword with which you can kill the Megawump.

As you find and use these objects, a tally is kept at the bottom of the screen. The left number shows the number of smart arrows you have; the right number shows the number of dumb arrows. You'll also see representations of the key and the sword, once you've found them. To use an item, press the left and right arrow keys on the keyboard to move the arrow indicator on the screen to the item you wish to use. You need not point the amulet to use it. Press the joystick's fire button to shoot an arrow or to use the key or sword. To aim either an arrow or the sword, push the joystick in the direction you wish to shoot or slash before pressing the trigger.

To kill the Megawump, you must have possession of three dumb arrows, the amulet and the magic sword. When you enter his room, first shoot him with the three arrows. Then, after he has changed color (which indicates vulnerability), use your sword. Show the Megawump no mercy!

When the title screen first appears, you'll see "Press START." Wait until the word "START" flashes, however, because the key doesn't respond until then. To pause during the game, press the space bar; press any other key to resume play. To end a game in the middle and then restart it, press [ESC].

HOW TO USE THE PROGRAM WITH 16K CASSETTE SYSTEMS

Type in Listing 1, check it with TYPO, and SAVE it to cassette. Next, type NEW to clear memory, and type in Listing 2. Check it with TYPO, and SAVE it to another cassette. Turn off the computer and then turn it on again. LOAD Listing 2, then insert a blank cassette into the program recorder and press RECORD and PLAY. Next, type RUN. When the computer beeps twice, press [RETURN].

At this point, the program writes a number table to the tape. After the number table is written on the tape, turn the computer off and then on again. LOAD Listing 1, then insert the tape with the number table and rewind it. Type RUN, and the program will load the number table into memory.

HOW TO USE THE PROGRAM WITH (MINIMUM 32K) DOS SYSTEMS

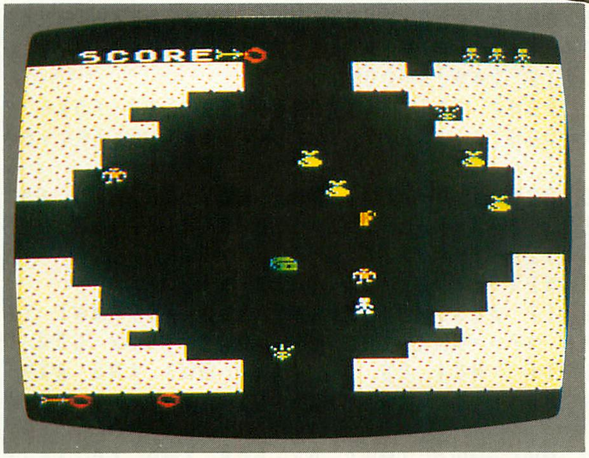
We've published the TYPO table in two parts for the benefit of readers who have only 16K of RAM. You should type in, SAVE and check each listing separately. When both of your TYPO tables match the published versions, you can merge the two programs. First LOAD Listing 2, delete lines 5000, 5095, and 5096, and then LIST it to disk. Next, LOAD Listing 1 and delete lines 5050 and 5060. Now ENTER Listing 2 to merge it with Listing 1, and SAVE the two together as one program.

*Anthony Ramos, 16, will be a senior at Brookside High School in Sheffield Lake, Ohio, this fall. He purchased his Atari 400 with the proceeds from a summer job, and says that he used every programming technique he knows—some of them courtesy of **Antic**—in Creepy Caverns. Anthony also provided the drawings that accompany this article.*



CAVERNS

by ANTHONY RAMOS



Listing 1

```
5 REM CREEPY CAVERNS
6 REM BY TONY RAMOS
7 REM ANTIC MAGAZINE
1Ø G=4:F=8:B=3:O=Ø:N=1:P=2:NØ=1Ø:L=6:DIM C(36,B),SA(B),DA(B),MO(N,5):SM=PEEK(1Ø6)-F:POKE 53277,B:GOTO 5ØØØ
11 X=B+PEEK(5377Ø)/18.22:Y=B+PEEK(5377Ø)/15:LOCATE X,Y,Z:IF Z<>32 THEN 11
12 PLOT X,Y:RETURN
2Ø POKE 756,SM+P:XR=O:YR=O:J=STICK(O):IF J=15 THEN 1ØØ
3Ø XR=(J<F AND J>G)-(J<12 AND J>F):YR=(J=9 OR J=13 OR J=5)-(J=NØ OR J=14 OR J=L):LOCATE XP+XR,YP+YR,Z
32 IF Z=32 THEN 6Ø
35 IF Z=143 THEN XR=O:YR=O:SOUND O,1ØØ,12,12:FOR T=N TO 25:NEXT T:SOUND O,O,O,O:GOTO 1ØØ
4Ø IF Z=174 THEN SCO=SCO+5Ø:POKE 1535+YO,PEEK(1535+YO)-N:FOR T=15 TO O STEP -Ø.8:SOUND Ø,35,G,T:NEXT T
43 IF Z=174 THEN SOUND Ø,Ø,Ø,Ø
45 IF Z=173 THEN SCO=SCO+8Ø:POKE 1571+YO,PEEK(1571+YO)-N:FOR T=15 TO O STEP -N:SOUND O,NØ,NØ,T:NEXT T
5Ø IF Z<>186 THEN 55
51 COLOR 186:PLOT F,23:FOR T=N TO G:SOUND O,18Ø-T*4Ø,NØ,T*B:FOR X=N TO 12:NEXT X:NEXT T:SOUND O,O,O,O:KE=O
55 IF Z=187 THEN COLOR 187:PLOT 11,23:FOR T=-NØ TO NØ STEP N:SOUND O,121,NØ,NØ-ABS(T):SOUND N,81,NØ,NØ-ABS(T)
56 IF Z=187 THEN NEXT T:AM=Ø
58 POSITION F,O:? #L;SCO
6Ø IF NOT QUPOS THEN 1ØØ
61 IF (XP+XR)<>(QUPOS-48)/F OR YP+YR<>11 THEN 1ØØ
62 SAT=SAT+(SA>-N)*5:DAT=DAT+(DA>-N)*5:POSITION P,23:? #L;SAT:POSITION 5,23:? #L;DAT:POKE 5325Ø,O:QUPOS=O
63 IF SA>-N THEN SA(SA)=O
64 IF DA>-N THEN DA(DA)=O
65 FOR T=14Ø TO 6Ø STEP -NØ:SOUND O,T,NØ,NØ:A=A:SOUND O,O,O,O:FOR X=N TO F:NEXT X:NEXT T
1ØØ COLOR 32:PLOT XP,YP:XP=XP+XR:YP=YP+YR:COLOR 159+(J>F AND J<12)*65-(J=15):PLOT XP,YP
1Ø2 IF PEEK(764)=255 THEN 15Ø
1Ø3 IF PEEK(764)=33 THEN 1Ø3
1Ø4 IF PEEK(764)=28 THEN POKE 764,255:RUN
1Ø5 COLOR O:PLOT N+PO*B,23:PO=PO+(PEEK(764)=7)-(PEEK(764)=L):PO=PO+(PO<O)-(PO=5)
1Ø6 POKE 764,O:COLOR 5:PLOT N+PO*B,23
11Ø SOUND O,1ØØ,NØ,F:FOR T=N TO NØ:NEXT T:SOUND O,O,O,O:POKE 764,255
15Ø IF STRIG(O) THEN 3ØØ
155 IF SW OR KE OR PO<>P OR XP<>(CHPOS-48)/F OR NOT PEEK(SM*256-223+YP*F) THEN 179
156 SOUND O,255,NØ,O:SOUND N,254,NØ,O:POKE 53768,N:CL=SM*256-224+YP*F:POKE CL,63:POKE CL+N,66:POKE CL+P,13Ø
16Ø X=255:SW=N:COLOR 189:PLOT 14,23:FOR T=175 TO 16Ø STEP -Ø.15:POKE 71Ø,X:X=X-N:POKE 53761,T:POKE 53763,T:NEXT T
```

continued on next page

```
179 IF PO=G THEN COLOR 189:PLOT XP,YP
180 SETCOLOR P,N,N0:IF STICK(O)=15 OR
PO>N OR  NOT PO AND  NOT SAT OR AX OR
AY OR PO=N AND DAT=O THEN 299
185 J=STICK(O):XR=(J>G AND J<F)-(J<12
AND J>F):YR=(J=9 OR J=13 OR J=5)-(J=N0
 OR J=14 OR J=L)
200 IF PO OR  NOT SAT THEN 210
205 SAT=SAT-N:POSITION P,23:? #L;SAT;"
 ";:AX=XP:AY=YP:POKE 708,52:GOSUB 250
206 FOR T=O TO N:IF MO(T,O)<100 THEN M
A=T:GOTO 300
208 NEXT T
210 IF DAT THEN DAT=DAT-N:POSITION 5,2
3:? #L;DAT;" ";:AX=XP:AY=YP:POKE 708,4
0:AV=XR:AW=YR:GOSUB 250
240 GOTO 299
250 FOR T=15 TO O STEP -0.8:SOUND O,22
7,12,T:NEXT T:SOUND O,O,O,O:RETURN
299 AC=32+PEEK(1784+AV+AW*B)
300 IF  NOT (AX+AY) THEN 350
310 IF PEEK(708)<>52 THEN 330
315 AV=SGN(MO(MA,O)-AX):AW=SGN(MO(MA,N
)-AY):AC=32+PEEK(1784+AV+AW*B)
330 IF AX+AV<>XP OR AY+AW<>YP THEN COL
OR AZ:PLOT AX,AY:AX=AX+AV:AY=AY+AW:LOC
ATE AX,AY,AZ:COLOR AC:PLOT AX,AY
340 IF AV=O AND AW=O OR AZ=143 OR AX=O
 OR AX=19 OR AY=N OR AY=22 THEN COLOR
AZ:PLOT AX,AY:AX=O:AY=O:AZ=32
345 IF MO(O,O)<>AX AND MO(O,N)<>AY AND
 MO(N,O)<>AX AND MO(N,N)<>AY THEN 350
346 FOR T=O TO N:IF (MO(T,O)<>AX OR MO
(T,N)<>AY) AND (MO(T,O)<>AX+AV OR MO(T
,N)<>AY+AW) THEN NEXT T:GOTO 350
347 MO(T,O)=100:MO(T,N)=100:COLOR 32:P
LOT AX,AY:PLOT AX+AV,AW+AY:SCO=SCO+100
0:FOR X=15 TO O STEP -0.5
348 SOUND O,60-X*P,F,F:NEXT X:SOUND O,
O,O,O:AZ=32:POSITION F,O:? #L;SCO:AX=O
:AY=O
349 POKE 1607+YO,PEEK(1607+Y0)-N:NEXT
T
350 POKE 756,SM:IF MO( NOT (W),O)<>100
 OR  NOT AM THEN W= NOT W
355 IF MO(W,O)=100 THEN 450
360 X=MO(W,O):Y=MO(W,N):IF ABS(X-XP)>M
R OR ABS(Y-YP)>MR THEN 380
370 MO(W,P)=SGN(XP-X):MO(W,B)=SGN(YP-Y
):GOTO 400
380 MO(W,5)=MO(W,5)-N:IF MO(W,5)>O THE
N 400
385 MO(W,5)=PEEK(53770)/64:MO(W,P)=INT
(PEEK(53770)/86)-N:MO(W,B)=INT(PEEK(53
770)/86)-N
400 COLOR 32:PLOT X,Y:X=X+MO(W,P):Y=Y+
MO(W,B):LOCATE X,Y,V
405 IF V=143 OR X=O OR X=19 OR Y=N OR
Y=22 THEN X=X-MO(W,P):Y=Y-MO(W,B)
410 Z=MC-(MC=N0 AND MO(W,P)=N):COLOR Z
:PLOT X,Y:MO(W,O)=X:MO(W,N)=Y
450 IF MW<>YO OR  NOT SW THEN 550
455 POSITION MWX,MWY:? #L;"  ":POSITIO
N MWX,MWY+N:? #L;"  ":MWX=MWX+SGN(XP-M
WX):MWY=MWY+SGN(YP-MWY)
456 POKE 708,104+MWC*48:GOSUB 800:FOR
T=15 TO O STEP -0.5:SOUND O,50,O,T:NEX
T T
460 IF PEEK(53770)>16 THEN 480
465 COLOR 90:PLOT MWX,MWY:DRAWTO XP,YP
:FOR T=O TO P:POKE 711,O:POKE 709,O:PO
KE 712,140:X=COS(O)
466 POKE 711,14:POKE 709,140:POKE 712,
O:X=COS(O):NEXT T:POKE 711,PEEK(1643+Y
O)
470 COLOR O:PLOT MWX,MWY:DRAWTO XP,YP:
GOSUB 800:FOR T=15 TO O STEP -0.2:SOUN
D O,120-T*F,F,T
471 NEXT T:IF AM THEN 610
480 IF ABS(MWX-XP)<P AND ABS(MWY-YP)<P
 AND XP>=MWX AND YP>=MWY THEN 580
482 IF  NOT PO OR (AX<>MWX AND AX<>MWX
+N) OR (AY<>MWY AND AY<>MWY+N) THEN 55
0
483 MWC=MWC-(MWC>O):FOR T=O TO 15:SOUN
D O,20,P,T:NEXT T:SCO=SCO+5000:AX=O:AY
=O:AZ=32:SOUND O,O,O,O
550 IF MO(O,O)=XP AND MO(O,N)=YP OR MO
(N,O)=XP AND MO(N,N)=YP THEN 600
552 IF XP>O AND XP<19 AND YP>N AND YP<
22 THEN 20
555 YO=YO-(XP=O)+(XP=19)-L*(YP=N)+L*(Y
P=22):XP=XP-18*(XP=19)+18*(XP=O):YP=YP
-20*(YP=22)+20*(YP=N)
556 AX=O:AY=O:GOSUB 4000:GOTO 20
580 IF PO=G AND  NOT STRIG(O) AND  NOT
 MWC THEN 1000
582 GOTO 605
600 IF MO( NOT W,O)=100 AND  NOT AM TH
EN 20
605 AX=O:AY=O:AZ=32:IF YO<>MW THEN COL
OR MC:PLOT XP,YP
606 FOR T=15 TO O STEP -0.4:SOUND O,80
,O,T:SOUND N,100,O,T:POKE 712,T:NEXT T
610 POKE 53768,N:RESTORE 680:FOR T=N T
O 11:READ X,Y:POKE 53761,O:POKE 53763,
O
615 A= NOT A:POKE 756,SM+A*P:POKE 5376
0,X:POKE 53762,X+N:POKE 53761,170:POKE
 53763,170
620 FOR Z=N TO Y*25:NEXT Z:NEXT T:EX=E
X-N:XP=N0:YP=20:IF EX>-N THEN GOSUB 40
```

```
00:GOTO 20
630 POSITION 5,N0:? #L;"GAME OVER":SOU
ND 0,0,0,0:SOUND N,0,0,0:POSITION 0,16
:POKE 77,128:GOTO 5042
680 DATA 108,3,108,2,108,1,108,3,91,2,
96,1,96,2,108,1,108,2,114,1,108,3
800 POSITION MWX,MWY:? #L;"\]":POSITIO
N MWX,MWY+N:? #L;"^_":RETURN
1000 COLOR 189:PLOT XP,YP:SOUND 0,255,
N0,0:SOUND N,254,N0,0:POKE 53768,N:FOR
 T=160 TO 175 STEP 0.15:POKE 53761,T
1005 POKE 53763,T:NEXT T:SOUND N,0,0,0
:FOR T=15 TO 0 STEP -0.3:SOUND 0,120-T
*F,0,T:POKE 708,T:NEXT T:Z=PEEK(560)
1006 FOR T=-N0 TO N0:FOR X=0 TO L:POKE
 560,Z:Y=Y*P:POKE 560,Z-N0+ABS(T):Y=Y/
P:NEXT X:SOUND 0,60,0,N0-ABS(T)
1008 NEXT T:POKE 708,54
1010 ? #L;"↖     SCORE%":POSITION B,N0:
? #L;"%%you did IT!!":FOR T=N TO 50:SC
O=SCO+500:POSITION N0,0:? #L;SCO
1015 FOR X=L TO 0 STEP -N:SOUND 0,21,4
,X:NEXT X:SOUND N,121,N0,G:SOUND P,81,
N0,(T>=N0)*G
1020 SOUND B,60,N0,(T>=20)*G:NEXT T:FO
R X=B TO 0 STEP -N:FOR T=0 TO P:POKE 5
3763+T*P,160+X
1030 NEXT T:NEXT X:GOTO 5042
4000 ? #L;"↖":POKE 559,0:SOUND 0,0,0,0
:SOUND N,0,0,0:RESTORE INT(5176+C(YO,P
)+C(YO,0)*P):COLOR 143:POKE 623,G
4010 POKE 77,0:FOR T=N TO 11:READ X:IF
 X THEN PLOT X,T:DRAWTO 0,T
4011 NEXT T:RESTORE 5176+C(YO,P)+C(YO,
N)*P
4020 FOR T=N TO 11:READ X:IF X THEN PL
OT 19-X,T:DRAWTO 19,T
4021 NEXT T:RESTORE 5176+C(YO,B)+C(YO,
0)*P
4030 FOR T=N TO 11:READ X:IF X THEN PL
OT X,23-T:DRAWTO 0,23-T
4031 NEXT T:RESTORE 5176+C(YO,B)+C(YO,
N)*P
4040 FOR T=N TO 11:READ X:IF X THEN PL
OT 19-X,23-T:DRAWTO 19,23-T
4041 NEXT T:COLOR 174:IF PEEK(1535+YO)
 THEN FOR T=N TO PEEK(1535+YO):GOSUB 1
1:NEXT T
4050 IF PEEK(1571+YO) THEN COLOR 173:F
OR T=N TO PEEK(1571+YO):GOSUB 11:NEXT
T
4060 MO(0,0)=100:MO(N,0)=100:IF YO=MW
OR NOT (PEEK(1607+YO)) THEN 4130
4100 FOR T=0 TO PEEK(1607+YO)-N:X=L+IN
T(F*RND(0))
4105 Y=F+INT(F*RND(0)):LOCATE X,Y,A:IF
 A=32 THEN MO(T,0)=X:MO(T,N)=Y:NEXT T:
GOTO 4130
4110 GOTO 4105
4130 IF AM=YO THEN COLOR 187:GOSUB 11
4140 IF KE=YO THEN COLOR 186:GOSUB 11
4150 IF CH<>YO THEN POKE 53251,0:GOTO
4200
4155 IF SW THEN POKE 53251,CHPOS:GOTO
4200
4160 FOR T=SN-176 TO SN-88:POKE T,0:NE
XT T:A=SN-176+INT(PEEK(53770)/25.5)*F
4170 FOR T=0 TO 7:POKE A+T,PEEK(SN+224
+T):NEXT T:POKE 707,198
4180 CHPOS=80+INT(PEEK(53770)/25.5)*F:
POKE 53251,CHPOS
4200 SA=-N:DA=-N:FOR T=0 TO P:IF SA(T)
=YO THEN SA=T
4210 IF DA(T)=YO THEN DA=T
4300 NEXT T:IF SA+DA=-P THEN POKE 5325
0,0:GOTO 4400
4310 FOR T=0 TO 7:POKE SN-392+T,PEEK(S
N+472+T):NEXT T:QUPOS=80+INT(N0*RND(0)
)*F:POKE 706,38+(SA>-N)*14
4320 POKE 53250,QUPOS
4400 POKE 711,PEEK(1643+YO):POKE 709,8
6-(YO>12)*30+(YO>24)*142:POSITION P,23
:? #L;SAT:POSITION 5,23:? #6;DAT
4410 COLOR ( NOT KE)*186:PLOT F,23:COL
OR ( NOT AM)*187:PLOT 11,23:COLOR SW*1
89:PLOT 14,23
4412 MR=G+P*(YO>12)+B*(YO>24):MC=N0+(Y
O>12)+(YO>24):IF EX THEN COLOR 190:PLO
T 18,0:DRAWTO 19-EX,0
4415 POSITION P,0:? #L;"score%";SCO:PO
KE 559,62:COLOR 5:PLOT N+PO*B,23:MO(0,
5)=N:MO(N,5)=N
4420 IF  NOT SW OR YO<>MW THEN RETURN
4430 POKE 708,0:MWX=N+(18-XP):MWY=N+(2
1-YP):GOSUB 800:DATA 108,121,108,121,1
36,144,162,173,162
4450 POKE 53768,N:POKE 53761,167:POKE
53763,167:RESTORE 4430:FOR T=N TO B:RE
AD X:POKE 53760,X:POKE 53762,X+N
4460 FOR Y=N TO 20+60*(T=B):NEXT Y:NEX
T T
4465 POKE 53764,B:FOR T=0 TO 15 STEP 0
.3:POKE 708,240+T:POKE 53765,64+T:NEXT
 T:POKE 53765,0:POKE 708,248
4470 COLOR 143:PLOT 0,N:DRAWTO 19,N:PL
OT 0,22:DRAWTO 19,22:GOSUB 4990
4480 PLOT 0,N:DRAWTO 0,22:PLOT 19,22:D
RAWTO 19,N:GOSUB 4990
4500 FOR T=N TO L:READ X:POKE 53760,X:
POKE 53762,X+N:FOR Y=N TO 50+150*(T>G)
:NEXT Y:NEXT T
```

continued on next page

```
4510 MWC=B:SOUND 0,0,0,0:SOUND N,0,0,0
:SOUND P,0,0,0:RETURN
4990 POKE 53764,40:FOR T=15 TO 0 STEP
-0.5:POKE 53765,T:NEXT T:X=P∧B:RETURN
5000 GRAPHICS 17:POKE 756,SM:POKE 708,
52:SN=SM*256:POKE 709,38:POKE 710,26:P
OKE 711,198:? #L;"   CREEPY  CAVERNS"
5005 POKE 54279,SM-F:? #L;"    BY TONY
 RAMOS":POSITION 0,14
5042 ? #L:? #L;"  5 LIVES per game PR
ESS START TO BEGIN";
5045 IF PEEK(SN+991)=56 THEN POKE 5327
9,F:GOTO 5095
5050 POKE 764,12:OPEN #N,G,128,"C":POK
E 850,7:POKE 852,0:POKE 853,SM:POKE´85
6,255:POKE 857,255
5060 DUMP=USR(ADR("hhh⌧LVd"),16):CLOSE
 #N
5094 RESTORE 5185:FOR T=0 TO F:READ X:
POKE 1780+T,X:NEXT T
5095 POKE 708,T:T=T-0.75+255*(T<N):IF
PEEK(53279)<>L THEN 5095
5175 SETCOLOR 0,B,G:POSITION G,22:? #L
;"%GET READY!":SOUND N,255,N0,F:SOUND
0,254,N0,F:POKE 53768,N
5176 DATA 9,9,7,6,6,4,5,3,2,1,1
5177 DATA 7,7,6,5,4,5,3,2,2,1,1
5178 DATA 9,9,7,5,5,4,2,3,1,0,0
5179 DATA 7,7,5,3,4,2,2,1,1,0,0
5181 FOR T=N TO 36:C(T,O)=((T-N)/L<>IN
T((T-N)/L)):C(T,N)=(T/L<>INT(T/L)):C(T
,P)=(T>L):C(T,B)=(T<31):NEXT T
5185 DATA 2,3,4,1,0,5,8,7,6
5190 FOR T=N TO 30:X=INT(G*RND(O)):Y=I
NT(36*RND(O))+N:K=Y-(X=O)+(X=N)-(X=P)*
L+L*(X=B):IF K<N OR K>36 THEN 5200
5192 ZZ=O:IF Y/L=INT(Y/L) THEN 5200
5194 Q=(X=O)+P*(X=B)+B*(X=P):R=C(Y,O)+
C(Y,N)+C(Y,P)+C(Y,B):S=C(K,O)+C(K,N)+C
(K,P)+C(K,B):IF R>N AND S>N THEN ZZ=N
5195 IF ZZ=N AND (R=N OR S=N) AND C(Y,
X)=N THEN 5200
5196 IF ZZ=N AND (R<B OR S<B) AND (Y<7
 OR Y>30) THEN 5200
5197 IF ZZ=N THEN ZZ=O:C(Y,X)=O:C(K,Q)
=O
5200 NEXT T:FOR T=N TO 72:POKE 1535+T,
(PEEK(53770)/32):NEXT T:FOR T=O TO 35:
POKE 1608+T,P:NEXT T
5210 MW=INT(L*L*RND(O))+N:YO=INT(L*L*R
ND(O)+N):IF ABS(YO-MW)<18 THEN 5210
5220 AM=INT(L*L*RND(O))+N:KE=INT(L*L*R
ND(O))+N:CH=INT(L*L*RND(O))+N:IF KE=CH
 OR AM=MW OR CH=MW THEN 5220
5221 POKE 1607+MW,O:FOR T=N TO 36:POKE
1643+T,P+INT(254*RND(O)):NEXT T
5225 SC=PEEK(88)+PEEK(89)*256
5230 FOR T=N TO L:IF T/P=INT(T/P) THEN
 DA(T/P-N)=N+(T-N)*L+INT(L*RND(O)):GOT
O 5235
5231 SA(T/P-0.5)=N+(T-N)*L+INT(L*RND(O
))
5235 NEXT T:PO=O:SAT=O:DAT=O:SCO=O:XP=
N0:SW=O:YP=19:EX=G:GOSUB 4000:GOTO 20
```

TYPO TABLE

Variable checksum = 1504958

Line num range		Code	Length
5	– 32	AN	510
35	– 55	PQ	552
56	– 104	JO	517
105	– 160	IF	509
179	– 299	RW	530
300	– 348	HB	556
349	– 410	BZ	544
450	– 480	TJ	500
482	– 605	QM	505
606	– 800	FI	511
1000	– 1020	LU	570
1030	– 4041	WK	500
4050	– 4170	RR	509
4180	– 4412	BY	603
4415	– 4470	PI	537
4480	– 5045	UB	547
5050	– 5181	LZ	566
5185	– 5210	SK	549
5220	– 5235	LS	367

Listing 2

```
5000 GRAPHICS 3:? "Working...":SM=(PEE
K(106)-8):SN=SM*256:TRAP 5050:LPRINT
5050 TRAP 40000:FOR T=0 TO 7:POKE SN+T
,0:POKE SN+512+T,0:NEXT T:FOR T=264 TO
 471:POKE SN+T,PEEK(57344+T)
5060 POKE SN+512+T,PEEK(57344+T):NEXT
T:RESTORE 5000:FOR T=0 TO 63:READ X:PO
KE SN+8+T,X:POKE SN+520+T,X:NEXT T
5061 FOR T=64 TO 103:READ X,Y:POKE SN+
8+T,X:POKE SN+520+T,Y:NEXT T:FOR T=104
 TO 239:READ X:POKE SN+8+T,X
5062 POKE SN+520+T,X:IF T=120 THEN T=2
00
5063 NEXT T:FOR T=240 TO 255:READ X,Y:
POKE SN+8+T,X:POKE SN+520+T,Y:NEXT T:P
OKE 53279,8
5064 FOR S=0 TO 1:FOR T=480 TO 511:REA
D X:POKE SN+T+S*512,X:NEXT T:NEXT S
5065 FOR T=472 TO 479:READ X:POKE SN+T
,X:POKE SN+512+T,X:NEXT T
5066 FOR T=0 TO 79:READ X:POKE SN+128+
T,X:POKE SN+640+T,X:NEXT T
```

```
5067 DATA 0,33,67,254,67,33,0,0,224,19
2,160,16,8,6,7,2,16,56,84,16,16,16,56,
108,7,3,5,8,16,96,224,64,0,132
5068 DATA 194,127,194,132,0,0,64,224,9
6,16,8,5,3,7,54,28,8,8,8,42,28,8,2,7,6
,8,16,160,192,224
5069 DATA 3,3,37,5,119,7,84,146,84,186
,84,170,220,238,136,68,192,192,164,160
,238,224,42,73,42,93,42,85,59,119
5070 DATA 17,34,56,56,84,84,254,254,18
6,186,186,186,40,40,104,44,12,96,124,1
24,186,186,214,214,214,214,124,124
5071 DATA 186,186,170,170,170,68,0,16,
68,146,40,84,0,0,56,56,108,84,40,56,16
,16,108,56,16,56,124,190,222,124
5072 DATA 255,239,255,251,255,191,255,
253,0,0,2,5,255,229,162,0,60,66,66,36,
24,60,60,24
5073 DATA 0,124,190,193,191,155,91,63,
64,96,48,58,30,12,30,6,56,56,16,56,84,
16,40,108,24,24,24,24,16,16,52,24
5074 DATA 88,24,16,16,104,16,76,24,24,
24,24,24,8,8,44,24,26,24,8,8,22,8,50,2
4
5075 DATA 12,4,3,7,37,38,110,111,24,16
,229,243,211,186,190,231,127,51,38,12,
30,30,0,0
5076 DATA 242,240,112,48,32,32,120,124
,24,8,167,175,203,93,125,231,48,32,192
,224,164,100,118,246,79,15,14
5077 DATA 12,4,4,30,62,254,204,100,48,
120,120,0,0,12,58,58,60,60,56,56,56
5078 DATA 56,124,206,198,198,230,124,5
6,24,56,120,24,24,24,56,124,124,206,10
2,6,124,224,192,254,60,102,14,24,12
5079 DATA 102,198,124,14,236,108,108,2
04,254,12,30,62,112,96,124,6,102,206,1
24,60,102,206,192,252,206,230,124
5080 DATA 126,198,12,12,24,24,48,120,1
20,204,230,124,206,194,102,60,120,204,
198,230,126,6,204,120
5095 OPEN #1,8,128,"C:":POKE 850,11:PO
KE 852,0:POKE 853,SM:POKE 856,0:POKE 8
57,4:DUM=USR(ADR("hhh⌧LVd"),16)
5096 CLOSE #1
```

TYPO TABLE

Variable checksum = 103270

Line num range	Code	Length
5000 — 5063	OG	507
5064 — 5070	YG	593
5071 — 5076	GO	547
5077 — 5095	TY	521
5096 — 5096	QJ	14

CROSS-REFERENCE YOUR BASIC VARIABLES

A programmer-productivity tool

by BILL BROWN

SYNOPSIS

This program creates a sorted list of variables from any SAVEd Atari BASIC program on disk or cassette. The accompanying article discusses Atari BASIC's structure, and may be difficult for beginning computerists to follow. The program requires Atari BASIC and 3500 bytes of RAM; it works on all Atari computers.

A cross-referenced list of a program's variables and the line numbers in which they appear is useful for finding duplicate or conflicting variable names. Conflicting variable names often occurs before merging two programs. The program in Listing 1 produces an alphabetized, cross-referenced list of variables for any Atari BASIC program on diskette or cassette. The resulting list can be stored on diskette or cassette, or output to screen or printer.

The program needs two pieces of information to produce a cross-referenced list. Initially, it asks for the device or file that contains the program to be analyzed. Here, the cassette user would respond with C:, and press [RETURN] at the beep; the disk user should enter D:FILENAME.BAS. The file should contain a tokenized Atari BASIC program created with the SAVE command. A cassette file created with the CSAVE command will not work—you must use SAVE "C:".

Next, the program prompts for the device or file to which the cross-referenced list will be written. Type C: to store the list on cassette; disk users should type D:FILENAME.CRF. Since the program writes the file to the same disk, you should make sure that there is ample free space on the disk to hold the variable table. Type E: to display the list on the screen, or P: to send the list to the printer.

At this point, the program begins to construct the cross-referenced list, and a report of the program's progress is displayed on the screen. As each line of the tokenized program is scanned, its line number is displayed. When all of the lines have been scanned, the variable names are alphabetically sorted. Each pass of the sort routine is also displayed on the screen. Finally, the completed list is written as a text file to the selected device or file. If you're saving the file on a cassette, the computer will beep twice (through the TV speaker with XL computers). If you're using cassette, insert a new tape, press RECORD and PLAY on the recorder, then press [RETURN] on the keyboard.

To access the target file, type in the following program (change the C: to D:FILENAME.CRC if you're using a disk-drive):

```
10 DIM HOLD$(500)
20 OPEN #2,4,0,"C:"
30 TRAP 50
40 INPUT #2,HOLD$:?
   HOLD$:GOTO 40
50 CLOSE #2
```

If you wish hard copy, change line 40 from ? HOLD$ to LPRINT HOLD$.

To use a cross-referenced list most effectively, you may need to refer back to the program listing. If you don't own a printer or a full-screen editor, this can be difficult. In this case, display the cross-referenced list on the screen, freezing the screen (with CTRL-1) at the point of interest. Earlier portions of the list can be repeated by entering GOSUB 6000 in direct mode.

HOW IT WORKS

This program's structure is dictated by the structure of a stored, tokenized Atari BASIC program file. Each file is divided into four major blocks:

(1) the zero-page pointers
(2) the variable name table
(3) the variable value table
(4) the token program

Zero-page pointers are two-byte values that point into the token file. The block is fourteen bytes long and consists of seven of the nine zero-page pointers that BASIC uses to maintain a token program in RAM. The pointers are:

continued on next page

Byte	Pointer	Description
0,1	LOMEM	Token-output-buffer pointer
2,3	VNTP	Variable-name-table pointer
4,5	VNTD	End of variable-name-table pointer
6,7	VVTP	Variable-value-table pointer
8,9	STMTAB	Statement-table pointer
10,11	STMCUR	Pointer to the current statement
12,13	STARP	String/Array Area pointer

While the program was in memory (before storage), the value of LOMEM was subtracted from each of these pointers, including LOMEM itself. Thus, LOMEM in the stored file is always equal to zero, and the values of the other pointers are offsets from LOMEM.

The zero-page-pointers block is read and used to compute the length of the variable-name table in lines 1000–1060.

The variable-name table is a list of all the variable names in the program. They are stored as ATASCII characters in the same order that they were entered into the program. The high-order bit of the last byte (or character) of each name is set to one. The program reads the variable-name-table block, saves it in RAM and computes the number of variables in the program. This occurs in lines 2000–2070.

The variable-value table provides current information on each variable. The table reserves eight bytes for each variable in the program. Since this program does not change the value of any variable in your main program, the values in the table are read, then ignored in lines 3000–3060.

The token program block is essentially the original BASIC program with its commands, operators, functions and variables replaced by one-byte tokens. This block is organized into program lines. Each program line has the following structure:

Bytes	Name	Description
0,1	NUMLINE	The BASIC line number
2	OFFLINE	The offset from the start of the current line to the start of the next line
3	OFFSTATE	The offset from the start of the current line to the start of the next statement
4	OFFSTATE–1	BASIC tokens and constants

The last two entries are repeated for multiple-statement lines. For example, the BASIC line:

```
10 LET X=1:PRINT X
```

generates the following in the token file:

Bytes	Hex Tokens	Description
0,1	0A 00	Line 10
2	13	Line offset
3	0F	Statement offset
4	06	LET
5	80	X
6	2D	=
7	0E	Numeric constant
8,13	40 01 00 00 00 00	1
14	14	:
15	13	Statement offset
16	20	PRINT
17	80	X
18	16	End of line

The immediate-mode line is the last line in a token program block. It is assigned line number 32768. The token program block is read and analyzed, line-by-line, in lines 4000–4080.

A variable's token is determined by its position in the variable name table, with its high-ordered bit set to one. For example, the first variable in a program is assigned the token value of 128 (80 hex) and the second variable is assigned 129 (81 hex). Thus, it is fairly simple, as in line 4044, to pick out references to variables—their token values will be greater than 127. The value of all tokens for commands, operators and functions is less than or equal to 127.

There are several exceptions to this rule, however. In string constants (token 0F hex), the high-order bits of characters entered in inverse video are set. Likewise, inverse-video characters that occur in REM statements (token 00 hex) and DATA statements (token 01 hex) also have the high-order bit set. Numeric constants (token 0E hex) may contain bytes that have the high-order bit set. Lines 4041–4043 handle such exceptions.

Each time a variable is detected, the program makes an entry into both the VREF and LREF arrays. References to particular variables are recorded indirectly, using a chained approach in the VREF array. The value of a link in the chain indicates the location of the next link. The first link is found by examining the element of VREF that corresponds to the variable's token value. The line number for each reference to a variable is given in the corresponding location in LREF.

A shell sort algorithm is used in lines 5000–5090 to alphabetize the variable names. Although the variable-name table remains unchanged, pointers into the table are rearranged with pointers into the variable-reference list to produce the alphabetized cross-reference list. The list is written to a device or file in lines 6000–6110.

```
100 REM VARIABLE CROSS-REFERENCE
101 REM BY BILL BROWN
102 REM ANTIC MAGAZINE
105 GRAPHICS 0:PRINT "ATARI BASIC CROSS-REFERENCE UTILITY"
110 DIM LABEL$(128),VNPTR(128),VNEND(128),SOURCE$(14),TARGET$(14)
120 PRINT :PRINT "ENTER SOURCE FILE";:INPUT SOURCE$
130 PRINT :PRINT "ENTER TARGET FILE";:INPUT TARGET$
135 POKE 755,0
140 OPEN #1,4,0,SOURCE$
150 GOSUB 1000
160 DIM VNTBL$(VNTL)
170 GOSUB 2000
180 DIM PREF(NV),ORDER(NV)
190 TEMP=(FRE(0)-1024)/12:NREF=NV
200 DIM VREF(TEMP),LREF(TEMP)
210 FOR I=1 TO NV:PREF(I)=I:ORDER(I)=I:VREF(I)=0:NEXT I
220 GOSUB 3000:GOSUB 4000
230 CLOSE #1
240 GOSUB 5000:GOSUB 6000
245 POKE 755,2
250 END
1000 REM (GET ZERO-PAGE POINTERS)
1010 GET #1,C:TEMP=C:GET #1,C
1015 IF TEMP<>0 OR C<>0 THEN PRINT "NOT A TOKENIZED FILE":END
1020 GET #1,C:TEMP=C:GET #1,C:VNTP=TEMP+256*C
1030 GET #1,C:TEMP=C:GET #1,C:VNTD=TEMP+256*C
1040 VNTL=VNTD-VNTP+1
1050 FOR I=1 TO 8:GET #1,C:NEXT I
1060 RETURN
2000 REM (GET VARIABLE NAMES)
2010 NV=0:VNTBL$=""
2020 LABEL$=""
2030 GET #1,C
2040 LABEL$(LEN(LABEL$)+1)=CHR$(C-128*(C>127))
2050 IF C<128 AND C<>0 THEN GOTO 2030
2060 IF C<>0 THEN NV=NV+1:VNPTR(NV)=LEN(VNTBL$)+1:VNEND(NV)=VNPTR(NV)+LEN(LABEL$)-1
2065 IF C<>0 THEN VNTBL$(VNPTR(NV))=LABEL$:GOTO 2020
2070 RETURN
3000 REM (BYPASS VARIABLE VALUES)
3010 FOR I=1 TO NV
3020 FOR J=1 TO 8
3030 GET #1,C
3040 NEXT J
3050 NEXT I
3060 RETURN
4000 REM (SCAN TOKENIZED FILE)
4010 GET #1,C:TEMP=C:GET #1,C:NUMLINE=TEMP+256*C:IF NUMLINE=32768 THEN GOTO 4075
4015 POSITION 0,9:PRINT "PROCESSING LINE ";NUMLINE
4020 GET #1,C:I=3:OFFLINE=C
4030 GET #1,C:I=I+1:OFFSTATE=C
4040 GET #1,C:I=I+1
4041 IF C=0 OR C=1 THEN FOR J=I+1 TO OFFLINE:GET #1,C:NEXT J:GOTO 4010
4042 IF C=14 THEN FOR J=1 TO 6:GET #1,C:I=I+1:NEXT J:GOTO 4050
4043 IF C=15 THEN GET #1,C:I=I+1:IF C>0 THEN TEMP=C:FOR J=1 TO TEMP:GET #1,C:I=I+1:NEXT J:GOTO 4050
4044 IF C>127 THEN TEMP=C-127:NREF=NREF+1:VREF(PREF(TEMP))=NREF:PREF(TEMP)=NREF:VREF(NREF)=0:LREF(NREF)=NUMLINE
4050 IF I<OFFSTATE THEN GOTO 4040
4060 IF I<OFFLINE THEN GOTO 4030
4070 GOTO 4010
4075 PRINT :PRINT "PROCESSING COMPLETE . . ."
4080 RETURN
5000 REM (SORT NAMES)
5010 PASS=0:J=NV:PASSES=INT(1.4427*LOG(J))
5020 PASS=PASS+1:J=INT(J/2)
5025 POSITION 0,13:PRINT "SORTING: PASS ";PASS;" OF ";PASSES;" PASSES"
5030 SORTED=1
5040 FOR I=1 TO NV-J:IJ=I+J
5050 IF VNTBL$(VNPTR(I),VNEND(I))<VNTBL$(VNPTR(IJ),VNEND(IJ)) THEN GOTO 5060
5051 TEMP=VNPTR(I):VNPTR(I)=VNPTR(IJ):VNPTR(IJ)=TEMP
5052 TEMP=VNEND(I):VNEND(I)=VNEND(IJ):VNEND(IJ)=TEMP
5053 TEMP=ORDER(I):ORDER(I)=ORDER(IJ):ORDER(IJ)=TEMP
5054 SORTED=0
5060 NEXT I
5070 IF SORTED=0 THEN GOTO 5030
5080 IF J>1 THEN GOTO 5020
5085 PRINT :PRINT "SORT COMPLETED . . ."
5090 RETURN
6000 REM (WRITE CROSS-REFERENCES)
6005 PRINT :PRINT "WRITING FILE . . ."
6010 OPEN #1,8,0,TARGET$:POKE 201,7
6015 PRINT #1;"CROSS-REFERENCES FOR ";SOURCE$:PRINT #1;NV;" VARIABLES, ";NREF-NV;" REFERENCES":PRINT #1
6020 FOR I=1 TO NV
```

continued on next page

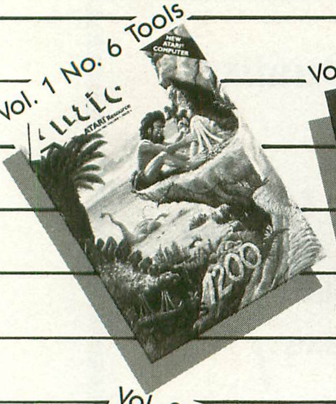
```
6030 PRINT #1:PRINT #1;VNTBL$(VNPTR(I)
,VNEND(I));
6040 TEMP=0:J=VREF(ORDER(I)):IF J=0 TH
EN PRINT #1:GOTO 6090
6050 IF TEMP=4*INT(TEMP/4) THEN PRINT
#1:PRINT #1;"       ";
6060 PRINT #1;LREF(J),:TEMP=TEMP+1
6070 J=VREF(J):IF J<>0 THEN GOTO 6050
6080 PRINT #1
6090 NEXT I
6100 CLOSE #1
6105 PRINT :PRINT :POSITION 0,21
6110 RETURN
```

TYPO TABLE

Variable checksum = 1260225

Line num range	Code	Length
100 – 170	NJ	337
180 – 1015	EV	331
1020 – 2060	QP	396
2065 – 4015	WY	293
4020 – 4075	OC	534
4080 – 5054	GG	357
5060 – 6040	JG	416
6050 – 6110	ED	200

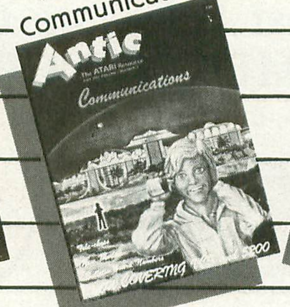
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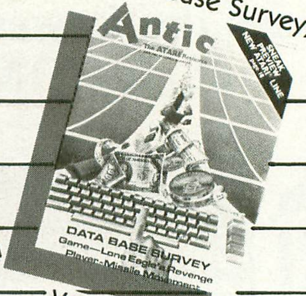
Vol. 2 No. 1 Games



Vol. 2 No. 2 Communication



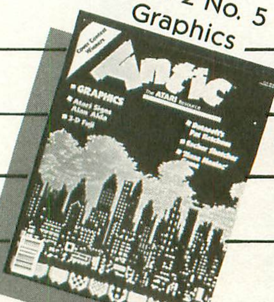
Vol. 2 No. 3 Data Base Survey



Vol. 2 No. 4 Adventure Games

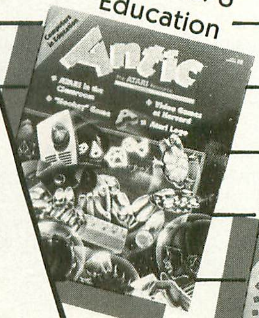


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THEY'RE GOING FAST!!

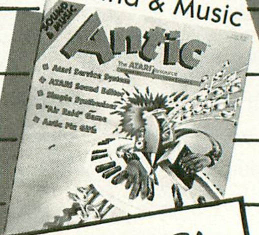
Vol. 2 No. 6 Education



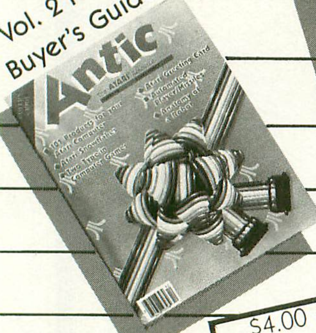
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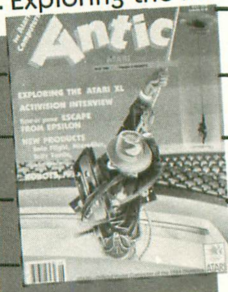
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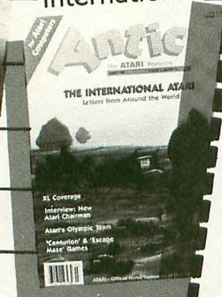
Vol. 3 No. 3 Communications



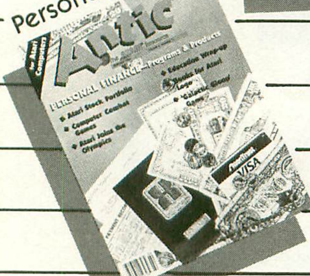
Vol. 3 No. 2 Exploring the XL



Vol. 2 No. 12 International



Vol. 2 No. 11 Personal Finance



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RENAMER

A simple way to rename Atari BASIC variables

by WILLIAM W. HOUGH

SYNOPSIS

This utility program lets you rename variables in a BASIC program. RENAMER requires Atari BASIC and 3500 bytes of RAM, in addition to the program being altered. It runs on all Atari computers.

Recently, a friend asked if I knew how to rename variables in Atari BASIC programs. I suggested that it would be easy to do with a word processor such as **Text Wizard** or **AtariWriter**. Simply LIST the program to disk or cassette and enter it as text into the word processor. The global-search-and-replace function makes quick work of changing all occurances of a variable.

Unfortunately, my friend didn't use any of these word processors on his cassette-based system. (AtariWriter is designed to be used with cassette systems —ANTIC ED.) After some thought, I attacked the problem directly. Using a co-resident program to change variable names in the variable name table, the modified program can be RUN or SAVEd without LISTing, modifying the text and ENTERing the listed program. The result, RENAMER, accompanies this article.

The RENAMER program appends new variable names to the variable name table, then copies the table into a string. The new name is switched with the old name, and the string is copied back into the variable name table. The RENAMER program must be LISTed on either cassette or disk. First, LOAD your BASIC program and compare it with RENAMER for conflicting line numbers. Renumber as necessary. ENTER the RENAMER program after you've loaded your BASIC program. To begin, type GOTO 27500.

You'll notice a pause while the program loads a machine-language routine into ZMOVE$. This routine transfers the variable name table to and from the strings ZVNT1$ and ZVNT2$. All variables in RENAMER begin with the letter "Z" to minimize their chances of being renamed, although it does no harm if they are. You must tell RENAMER whether you're changing the name of a numeric variable, an array or a string. Next, type the variable's old name, and then its new name. String variables do not need the "$" identifier, since you've already identified them.

The Atari forced-read mode appends new variables to the variable name table. If the new name you've entered already exists, the RENAMER reports the duplication to you, and asks whether the name change is intentional. If so, type "Y", and the change is made. In this case, the name will appear twice in the table: once in its original form, and once in its new form. This is possible because the variables don't use the same token, and may not have the same value.

Every variable used in a BASIC program is assigned its own token. Tokens are one-byte representations of variables that are used to save space in memory. The token is assigned when the variable is first used. This token is also tied to the variable's corresponding value in the variable value table. The RENAMER program "puts a new label" on a token. The value the token refers to, and the way a program handles the token remain the same. RENAMER can give every variable in a program the same name without affecting the operation of the program. However, such programs should *not* be LISTed to a cassette or disk; they *must* be SAVEd.

The RENAMER program uses 13 different variable names (start with Z) which are added to the variable name table. To get rid of the extra names, and to save programming space, follow this procedure: LIST the program to tape or disk, type NEW and ENTER the LISTed program, and SAVE it. This should be done after every renaming session.

Occasionally, if you're renaming a variable with a name that already exists, and the new name is very long, you won't be able to rename the variable. If this happens, you'll be notified, and asked if you want to rename another variable.

Dialogue with RENAMER requires a simple yes or no response. A capital "Y" means "Yes." Any other keyboard response is taken as "No." An example of a Yes/No question is: "Do you want to change another variable?" This occurs

continued on next page

after each successful pass, or when the old variable name entered isn't in the table. If you don't want to change any more variable names, you're asked if you want to delete the RENAMER program. The final routine deletes every line in the RENAMER program from your program in memory by entering RENAMER's line numbers in the forced-read mode.

POTENTIAL PROBLEMS

When working with a long program with many variables, RENAMER may generate an ERROR 4 message. ERROR 4 indicates the program has exceeded the computer's limit of 128 variable names. This can occur while the renaming program is being ENTERed, or while RENAMER is running. To correct this, LIST the original program to cassette or disk, type NEW and ENTER it again. This clears unused names from the variable name table. If this is unsuccessful, use RENAMER on itself. Change the Z-name variables of RENAMER to variable names already used in your main program. This fools BASIC into "thinking" you are using fewer variables. After renaming the "Z" variables, LIST the RENAMER program back to cassette/disk, LOAD/ENTER your main program, then ENTER the new RENAMER last.

One other possible problem deserves mention. BASIC will only accept up to three lines of code with the same line number. If your original program already contains long lines of code, and your new variable names are longer than your old names, this three-line limit may be exceeded. This is only a problem when you attempt to correct or change one of these long lines. If you do this, the line is truncated when the RETURN key is pressed. If you want to edit such a line, you must break it into two lines with separate line numbers first.

Remember, you *must* LOAD your main BASIC program before ENTERing the RENAMER program. RENAMER will not function properly otherwise.

William W. Hough, an engineer with degrees from Northwestern and Stanford, has been interested in microcomputers for a relatively short time, but mastering the Atari has become a principal leisure-time activity for him. Bill also is the author of a logic game, Brainboggler, which is available through Educational Software, Inc.

```
27500 CLR :DIM ZMOVE$(54):RESTORE 27501:FOR ZCT=1 TO 54:READ ZLG:ZMOVE$(ZCT,ZCT)=CHR$(ZLG):NEXT ZCT
27501 DATA 104,104,133,204,104,133,203,104,133,206,104,133,205,104,133,208,104,133,207,166,208,240,16,160,0
27502 DATA 177,203,145,205,136,208,249,230,204,230,206,202,208,242,164,207,136,192,255,240,7,177,203,145,205
27503 DATA 24,144,244,96
27504 DIM ZOLDV$(20),ZNEWV$(20),ZTEMP$(20),ZCHAR$(1)
27505 GRAPHICS 0:? :? "          BASIC VARIABLE RENAMER":? "          by W. W. Hough 1/84":? :? :OPEN #1,4,0,"K:"
27506 ? "Do you want to change the name of a":? :? "    1. Scalar (number)":? "    2. Array":? "    3. String"
27507 ? :? "Answer 1, 2, or 3 ";
27508 GET #1,ZANS:ZANS=ZANS-48:IF ZANS<1 OR ZANS>3 THEN 27507
27509 ? :? :? "Change ";:ON ZANS GOSUB 27510,27511,27512:? " variable.":GOTO 27513
27510 ? "NUMERIC";:RETURN
27511 ? "ARRAY";:RETURN
27512 ? "STRING";:RETURN
27513 CLOSE #1:? :? "What's the old name ";:INPUT ZOLDV$:? :? "What's the new name ";:INPUT ZNEWV$
27514 ZTEMP$=ZNEWV$:GOSUB 27531:ZNEWV$=ZTEMP$:ZTEMP$=ZOLDV$:GOSUB 27531:ZOLDV$=ZTEMP$:GRAPHICS 0:POSITION 2,4
27515 ON ZANS GOSUB 27516,27518,27519:GOTO 27520
27516 ? ZNEWV$;"=1":GOSUB 27534:POKE ADR(ZNEWV$)+LEN(ZNEWV$)-1,PEEK(ADR(ZNEWV$)+LEN(ZNEWV$)-1)+128
27517 POKE ADR(ZOLDV$)+LEN(ZOLDV$)-1,PEEK(ADR(ZOLDV$)+LEN(ZOLDV$)-1)+128:RETURN
27518 ? "DIM ";ZNEWV$;"(1)":GOSUB 27534:ZNEWV$(LEN(ZNEWV$)+1)="(":ZOLDV$(LEN(ZOLDV$)+1)="(":RETURN
27519 ? "DIM ";ZNEWV$;"$(1)":GOSUB 27534:ZNEWV$(LEN(ZNEWV$)+1)="$":ZOLDV$(LEN(ZOLDV$)+1)="$":RETURN
27520 IF ZNEWV$=ZOLDV$ THEN 27544
27521 ZVNTP=PEEK(130)+256*PEEK(131):ZVNTLG=PEEK(132)+256*PEEK(133)-ZVNTP
27522 DIM ZVNT1$(ZVNTLG),ZVNT2$(ZVNTLG):ZVNT1$="A":ZVNT1$(ZVNTLG)="A":ZVNT1$(2)=ZVNT1$
27523 ZLG=USR(ADR(ZMOVE$),ZVNTP,ADR(ZVNT1$),ZVNTLG):ZVNT2$=ZVNT1$:ZLG=1
27524 FOR ZCT=1 TO ZVNTLG-LEN(ZNEWV$):IF ZVNT1$(ZCT,ZCT+LEN(ZNEWV$)-1)=ZNEWV$ THEN 27536
27525 NEXT ZCT:GOTO 27527
27526 POP :ZLG=0
27527 FOR ZCT=1 TO ZVNTLG-LEN(ZOLDV$)+1:IF ZVNT1$(ZCT,ZCT+LEN(ZOLDV$)-1)=ZOLDV$ THEN 27540
27528 NEXT ZCT
```

```
27529 ? :? "There's no variable by that name in":? "the Variable Name Table."
27530 ? :? "Do you want to change another":? "variable ?";:GOTO 27545
27531 ZLG=LEN(ZTEMP$):ZCHAR$=ZTEMP$(ZLG,ZLG):IF ZCHAR$<"0" OR ZCHAR$>"Z" THEN ZTEMP$=ZTEMP$(1,ZLG-1):GOTO 27531
27532 IF ZCHAR$>"9" AND ZCHAR$<"A" THEN 27529
27533 RETURN
27534 ? :? :? "CONT":POSITION 2,0:POKE 842,13:STOP
27535 POKE 842,12:RETURN
27536 IF ZCT>1 AND ASC(ZVNT1$(ZCT-1,ZCT-1))<128 THEN 27525
27537 ? :? "The new variable name already exists.":? "Is this change intentional?";
27538 OPEN #1,4,0,"K:":GET #1,ZANS:CLOSE #1:IF ZANS=89 THEN ? :? :? "OK, Don't forget to LIST file":GOTO 27526
27539 POP :GOTO 27500
27540 IF ZCT>1 THEN IF ASC(ZVNT1$(ZCT-1,ZCT-1))<128 THEN 27528
27541 TRAP 27542:ZVNT2$(ZCT+LEN(ZNEWV$),ZVNTLG-LEN(ZOLDV$))=ZVNT1$(ZCT+LEN(ZOLDV$),ZVNTLG-LEN(ZNEWV$))
27542 TRAP 27548:ZVNT2$(ZCT,ZCT+LEN(ZNEWV$)-1)=ZNEWV$:IF ZLG THEN ZVNT2$(ZVNTLG-LEN(ZOLDV$)+1,ZVNTLG)=ZOLDV$
27543 TRAP 40000:ZLG=USR(ADR(ZMOVE$),ADR(ZVNT2$),ZVNTP,ZVNTLG)
27544 ? :? "All done with that variable!  Do you":? "want to change another?";
27545 OPEN #1,4,0,"K:":GET #1,ZANS:IF ZANS=89 THEN CLOSE #1:POP :GOTO 27500
27546 ? :? :? "Do you want to delete the renamer ?";:GET #1,ZANS:CLOSE #1:IF ZANS=89 THEN 27549
27547 ZPROTECTION=1:CLR :END
27548 ? :? "Sorry, no room to repeat variable of":? "the length of your new variable name.":GOTO 27530
27549 ZCT=27500:ZNEWV$="CONT":GRAPHICS 0
27550 POSITION 2,4:FOR ZLG=ZCT TO ZCT+13:? ZLG:NEXT ZLG:? ZNEWV$:ZCT=ZCT+14:POSITION 2,0:POKE 842,13:STOP
27551 POKE 842,12:GRAPHICS 0:IF ZCT<27539 THEN 27550
27552 ZNEWV$="POKE 842,12:GR.0":GOTO 27550
```

TYPO TABLE

Variable checksum = 562204

Line num range	Code	Length
27500 – 27506	CV	574
27507 – 27517	RD	541
27518 – 27529	DZ	569
27530 – 27538	SL	509
27539 – 27548	CF	598
27549 – 27552	II	225

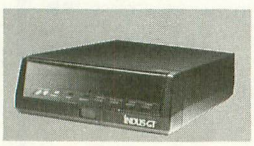


DRIVE MODEL:	TRAK AT-D2	RANA 1000	INDUS GT	ATARI 1050	ASTRA 1620	ATARI 810
FORMATS SUPPORTED:	SINGLE/DOUBLE	SINGLE/ ENHANCED/ DOUBLE	SINGLE/ ENHANCED/ DOUBLE	SINGLE/ENHANCED	SINGLE/DOUBLE	SINGLE
DRIVE MECHANICS:	5¼" THINLINE TEAC (DIRECT DRIVE)	5¼" THINLINE MPI (BELT DRIVE)	5¼" THINLINE TANDON (DIRECT DRIVE)	5¼" THINLINE TANDON (DIRECT DRIVE)	TWO 5¼" THINLINE MPI (BELT)	5¼" TANDON (DIRECT DRIVE)
MTBF:	10,000 HRS.	9200 HRS.	10,000 HRS.	10,000 HRS.	9200 HRS.	10,000 HRS.
SLAVE DRIVE OPTION:	YES	NO	NO	NO	NO (two drives included)	NO
PRINTER PORT:	YES	NO	NO	NO	NO	NO
BUFFERSIZE/ EXPANDS TO:	2K/16K	NA[3]	NA	NA	NA	NA
FORMAT BACK OF DISK?:	YES	NO	YES	YES	NO	YES
FRONT PANEL CONTROLS[1]/ READOUTS:	WRITE-PROTECT, TRACK #, DENSITY, READ/WRITE	WRITE-PROTECT, TRACK #, ERROR STATUS, DENSITY, UNIT ID	ERROR STATUS, WRITE-PROTECT, TRACK #, DRIVE TYPE	ON-OFF	ON-OFF	ON-OFF
POWER SWITCH LOCATION:	FRONT	REAR	REAR	FRONT	FRONT	FRONT
TRACK BUFFERING:	YES	NO	YES (WITH SYNCHROMESH)	NO	NO	NO
RELIABILITY:	HIGH	HIGH	HIGH	HIGH	GOOD	MEDIUM
DOS SUPPLIED:	NONE	SMART DOS	DOS XL	DOS 3	DOS XL	DOS 2.0
SOFTWARE SUPPLIED:	TADS[2], GAMES	NONE	WORD PROCESSOR, DATABASE, SPREADSHEET	NONE	NONE	NONE
DOCUMENTATION:	GOOD	GOOD	GOOD	GOOD	VERY GOOD	ADEQUATE
DIAGNOSTICS?:	YES	YES	NO	NO	NO	NO
BENCHMARK READ TIME:	9 SECONDS	10 SECONDS	10 SECONDS	10 SECONDS	10 SECONDS	10 SECONDS
READ WITH TURBO:	5 SECONDS	NA	NA	NA	NA	NA
BENCHMARK WRITE TIME:	10 SECONDS	11 SECONDS	11 SECONDS	12 SECONDS	11 SECONDS	15 SECONDS
BENCHMARK WRITE TIME WITH WRITE-VERIFY:	25 SECONDS	25 SECONDS	26 SECONDS	31 SECONDS	26 SECONDS	31 SECONDS
WARRANTY:	90 DAYS	120 DAYS	1 YEAR	90 DAYS	90 DAYS	90 DAYS
RETAIL PRICE:	$499.00	$449.00	$449.00	$499.95	$595.00	$599.00
TWO-DRIVE SYSTEM RETAIL PRICE:	$848.00	$898.00	$898.00	$999.90	$595.00	$1198.00

(1) All drives' front panels have a power on/off indicator, as well as a "busy" light that shows when the drive is spinning.
(2) TADS is a program that converts your copy of DOS 2.0 to double-density operation.
(3) NA—Not Applicable

DISK DRIVE SURVEY
continued from page 39

INDUS GT



The **Indus GT** is the latest arrival in disk drives for the Atari. Going head-to-head with Rana was no easy task, but the people at Indus seem to have done OK. The GT comes packaged in a handsome, compact, and soundproof black metal case. A smoked-glass dust cover protects the drive door and controls, and opens at the touch of a button. The Indus comes packaged in a hard plastic carrying case, complete with a four-part software package that includes DOS XL from OSS Software.

GT FEATURES

Every GT drive from Indus sports an "ACCU-TOUCH" control panel, similar to the ones found on the Trak and Rana units. The panel features a two-digit display and four buttons that give access to information about drive status. As with Rana, the panel is located at the bottom of the drive mechanism, but it's angled upward and is easier to read.

The accompanying software package includes DOS XL, the GT Word Processor, the GT Data Manager, and a spreadsheet program. These programs can't be covered within the scope of this article, but my preliminary experience with them indicates that they are worthwhile. *(Watch for a review in a future issue. —ANTIC ED)*

Software compatibility wasn't a problem with the GT. All of the protected software in my library worked well with it. However, one annoying feature of the drive pops up whenever you try to load protected software. When the GT encounters a read/write error, it sends a "beep" and an error message to your TV or monitor.

The GT has no provision for a slave drive, nor is there a printer port.

SYNCHROMESH

This software-based modification to the Indus allows track buffering. It also changes data transmission from asynchronous to syn-

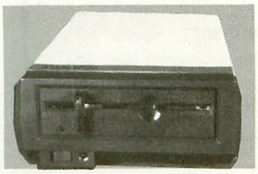
chronous, speeding up data transfer four times. If you've bought an Indus that didn't include SynchroMesh, and you've sent in your warranty card, you'll be sent (or have already received) this automatically.

CONCLUSION

The Indus GT has a retail price of $499.99, and comes with the only one-year warranty in the business. When you include the longest warranty of any drive, free software, ease of use, and compatibility, as well as the carrying case, the Indus is a good value. *(Also the most hi-tech looking.* —ANTIC ED*)*

Indus Systems, 9304 Deering Ave., Chatsworth, CA 91311. (800) 334-6387, In CA (800) 544-6387.

ATARI 1050



I call the **Atari 1050** a no-frills drive because it was designed simply to read and write disks. There are no digital readouts, no printer ports—no on-board frills.

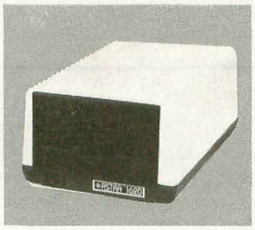
Atari's 1050 is a good drive—it does well everything it's supposed to do. The 1050 is similar to its older brother, the 810, with a few differences. First, it uses a half-height drive mechanism for compactness. Much more importantly, the 1050 is capable of what Atari calls "enhanced density." Enhanced density is not double-density; it is actually one-and-a-half-density. The new Atari format uses 26 sectors per track instead of 18, which gives the 1050 about 127K bytes of formatted storage in this mode. This compares to 176K for true double density, and 88K for single density. While this does give the 1050 more storage than the 810, it's a mystery why Atari just didn't use the standard double-density format used by other manufacturers. The 1050 can also operate in single-density mode.

The new density format is supported by Atari's new DOS 3.0, which will be available when you read this. If you've bought a 1050 that came with DOS 2.0 and have sent in your warranty card, you can obtain a free copy of DOS 3 and documentation by sending a request (include your drive's serial number) to: Atari Customer Relations, 1312 Crossman Ave., P.O. Box 61657, Sunnyvale, CA 94088. Alternatively, see "Do More with DOS 2.0" in this issue for a way to obtain increased storage capacity with a 1050 and DOS 2.0.

The 1050 retails for $449.99. Atari warrants it for 90 days. The 1050 is a good drive, is compatible with all software, and should provide years of trouble-free service.

Atari Customer Relations, Attn: Clarice Weisbach, 1312 Crossman Ave., Sunnyvale, CA 94088. (408) 745-4851.

ASTRA 1620



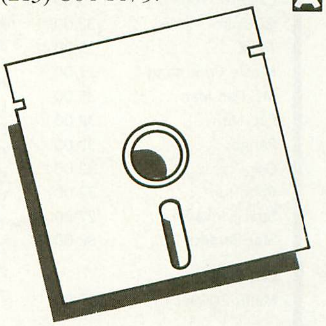
The **Astra 1620** is the only drive in our survey that boasts dual drives as standard equipment. For $100–$200 more than the average disk drive system, you can have the Astra drive and its double-density dual disk drives. A two disk system makes many jobs easier. Word processing, spreadsheet and database use, and disk backup are easier with two drives.

The 1620 uses two half-height drives housed in a plastic case. Measuring 7 7/8″ × 11 7/8″ × 5 7/8″, the Astra takes up less desk space than one Atari 810. To compare, it would take four 810's to equal the Astra's maximum storage capacity of 320K. You can configure the drives in any combination of single and double density via software. No switches are available, nor are they necessary.

Apart from the two drives, there is little else that distinguishes the Astra from other drives in our survey. There is no built-in printer port or digital readout. The Astra 1620 uses the same clumsy drive-door mechanics as the Rana 1000. *(As this issue was going to press, we learned that Astra has changed the door mechanisms on its drives to one that is easier to use.* —ANTIC ED*)*

The Astra drive works fine. It reads and writes in both single and double density with no difficulty. Its operation is quiet and smooth, and the small size and relatively low price make it an attractive system. To those looking for a reliable system without a lot of frills, and who need two drives, I recommend the Astra 1620.

Astra Systems, 5230 Clark Ave., Lakewood, CA 90712. (213) 804-1475.





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by DAVID DUBERMAN
Technical Editor

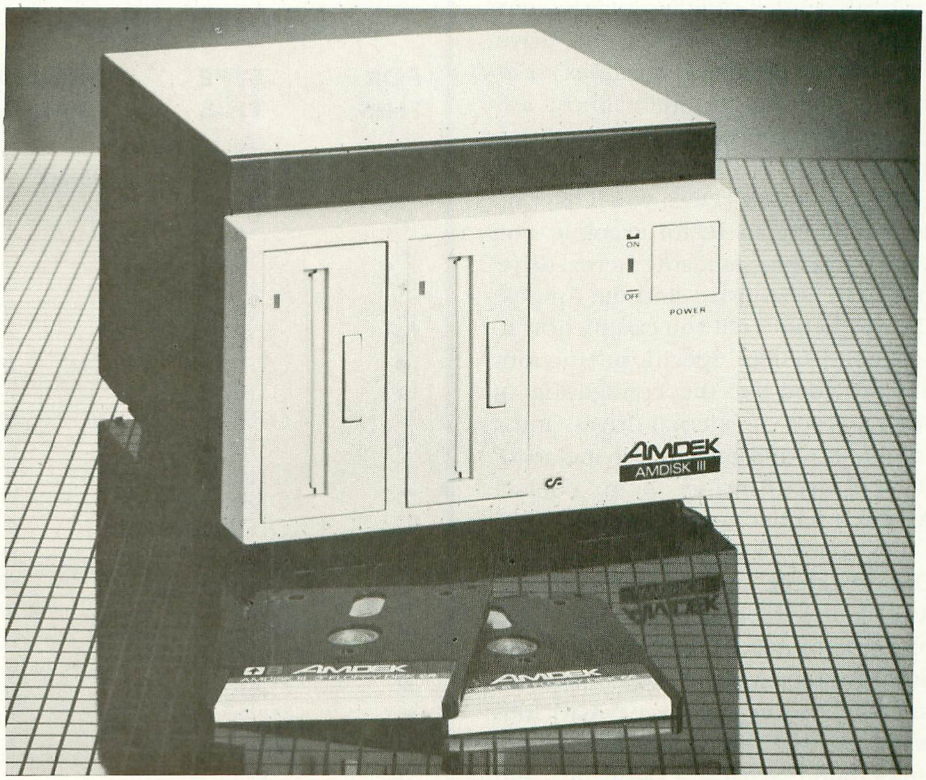
Until today, one of the weakest links in the home computing chain has been the floppy disk. Developed in the early 1970's by IBM, floppies were first used in laboratory and office environments. They were developed to be an inexpensive alternative to tape or cartridge storage. To achieve these goals, a thin mylar floppy disk enclosed in a thin jacket was used.

Now floppies are found just about any place you can find an Atari. Unfortunately, floppies are vulnerable to physical damage caused by spills, dust, fingerprints, smoke particles and rough handling.

Once a disk is damaged, it becomes practically impossible to retrieve data from it. Children, in particular, have a difficult time remembering how to handle these disks properly.

To solve this problem, Amdek introduced its AMDC three-inch disk drive. Available as a single (**AMDC I**) or a double-drive (**AMDC II**) system, the Amdek records in single and double density on three-inch disks that offer a total storage capacity of 180,000 bytes per disk side. You must, however, turn the diskette over to use the other side.

The drive itself is a compact beauty. Styled similarly to Atari's XL line, it measures 7 3/8-inches wide by 5 1/2-inches high by 8 5/8-inches deep. The diskettes measure about three by four inches, and fit easily in your shirt pocket. The recording medium is still mylar, but it is enclosed in and fully pro-



tected by a hard plastic case. Even the hole through which the disk-drive head contacts the disk medium is covered until the disk is inserted into the drive.

EASY TO USE

It's virtually impossible to insert the disk into the drive improperly, and disks pop out at the press of a button. To prevent accidental erasure of data, you simply move a small tab on the disk to engage write-protection. Each drive has a busy light, which shows green if you're using the disk's front side, and red if you're using the back—a truly considerate and user-friendly feature. There's also an on/off indicator light next to the flush-mounted, oversized power switch.

One of the Amdek's best features is that it lets you attach off-the-shelf 5-inch disk drives. Such drives can be purchased for about $200—substantially less than the cost of Atari-specific five-inch drives. You can configure the system to load commercial software from the standard drive—even heavily copy-protected disks work fine! There's also

continued on next page

a parallel printer port, identical to the one found on the Atari 850 interface, to which you can attach any Centronics-compatible printer. A cooling fan on the back of the unit makes a small amount of noise.

The Amdek drive comes with OSS's **DOS XL**, which is a significant improvement over the previous version, OS/A+, particularly for beginning users. (Look for a survey of DOS's, including DOS XL, in an upcoming issue of **Antic**. —ANTIC ED) A number of utilities are also included on the DOS XL disk. Among these are programs that configure drives to different densities, set the printer port's timeout value, and specify sector order on the disk.

In addition to the 152-page DOS XL manual, Amdek supplies a fairly complete 31-page manual for the drive. Included are detailed instructions for installing the Amdek into almost any imaginable configuration of hardware and software. If you prefer using Atari **DOS 2.0** to OSS's DOS, you'll have no trouble doing so. If, for example, you want to use one standard external drive, one Atari 1050 drive, and the Amdek, the instructions tell you exactly how to set up this system. Specific instructions are provided for the configuring of several types of external drives, and a troubleshooting guide is also included. If you need further help, contact Amdek's service representatives.

LJK's database management program, **Data Perfect**, also comes with the Amdek on a three-inch disk. LJK is also planning to make **Letter Perfect** and **Spell Perfect** available. Other manufacturers that soon will release Atari software in the three-inch format are Broderbund, Synapse, Continental, and Penguin Software. Blank disks, available from Amdek and your local computer dealer, cost $5.99.

The Amdeks cost a bit more than other drives for the Atari, but this extra expense is more than justified by their printer port and external drive options, and by the sense of security offered by their virtually indestructible disks. The AMDC I lists for $550, and the AMDC II for $760. Amdek's address is: 2201 Lively Blvd., Elk Grove Village, IL 60007. Their telephone number is: (312) 364-1180.

listing conventions

Table Information

Our custom font listings represent each ATASCII character as it appears on the video screen. You generate some characters by a single keystroke, for example, the regular alphabet. Others require a combination or sequence of keystrokes. In this table, ESC means *press and release* the escape key before pressing another key. CTRL or SHIFT means *press and hold* the control or shift key while simultaneously pressing the following key.

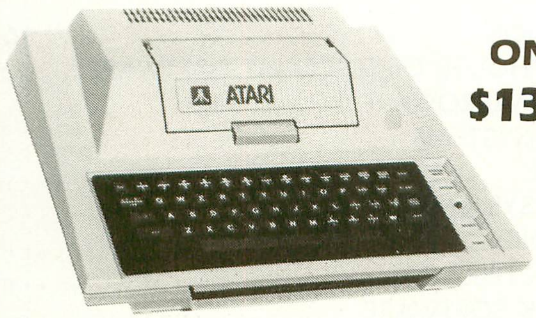
The Atari logo key (人) "toggles" inverse video for all alphanumeric and punctuation characters. Press the logo key once to turn it on; press again to turn it off. In the XL line there is no logo key; inverse video is controlled by the Reverse Video Mode key. Decimal values are given as reference, and correspond to the CHR$ values often used in BASIC listings.

NORMAL VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	CTRL ,	0
	CTRL A	1
	CTRL B	2
	CTRL C	3
	CTRL D	4
	CTRL E	5
	CTRL F	6
	CTRL G	7
	CTRL H	8
	CTRL I	9
	CTRL J	10
	CTRL K	11
	CTRL L	12
	CTRL M	13
	CTRL N	14
	CTRL O	15
	CTRL P	16
	CTRL Q	17
	CTRL R	18
	CTRL S	19
	CTRL T	20
	CTRL U	21
	CTRL V	22
	CTRL W	23
	CTRL X	24
	CTRL Y	25
	CTRL Z	26
	ESC ESC	27
	ESC CTRL −	28
	ESC CTRL =	29
	ESC CTRL +	30
	ESC CTRL *	31
	CTRL .	96
	CTRL ;	123
|	SHIFT =	124
	ESC SHIFT CLEAR	125
	ESC DELETE	126
	ESC TAB	127

INVERSE VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	人CTRL ,	128
	人CTRL A	129
	人CTRL B	130
	人CTRL C	131
	人CTRL D	132
	人CTRL E	133
	人CTRL F	134
	人CTRL G	135
	人CTRL H	136
	人CTRL I	137
	人CTRL J	138
	人CTRL K	139
	人CTRL L	140
	人CTRL M	141
	人CTRL N	142
	人CTRL O	143
	人CTRL P	144
	人CTRL Q	145
	人CTRL R	146
	人CTRL S	147
	人CTRL T	148
	人CTRL U	149
	人CTRL V	150
	人CTRL W	151
	人CTRL X	152
	人CTRL Y	153
	人CTRL Z	154
	ESC SHIFT DELETE	156
	ESC SHIFT INSERT	157
	ESC CTRL TAB	158
	ESC SHIFT TAB	159
	人CTRL .	224
	人CTRL ;	251
	人SHIFT =	252
	ESC CTRL 2	253
	ESC CTRL DELETE	254
	ESC CTRL INSERT	255



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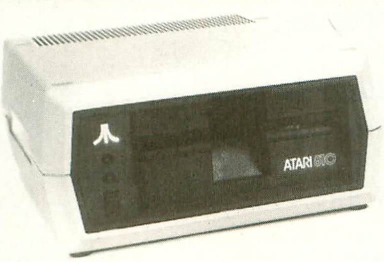
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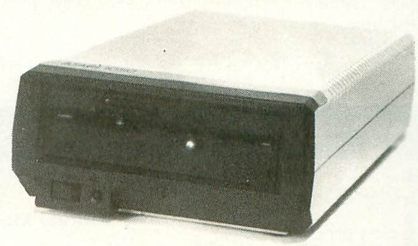
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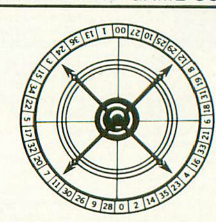
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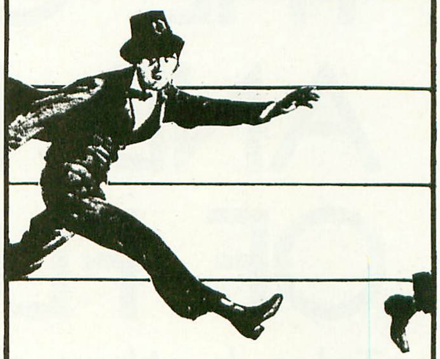
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THE CARE AND FEEDING OF FLOPPY DISKS

Take better care of your floppies

by DAVID DUBERMAN

Just what are floppy disks?

Those who are still chained to cassette recorders for data storage would probably like to get to know them better. Those of us who use them every day rarely give these plain black utilitarian devices a second thought. Yet, while this article introduces floppy disks to new users, it may also offer some tips to experienced disk users.

Two components make up a floppy disk: the disk and its jacket. The disk itself is made of thin mylar, coated on both sides with the same iron oxide used on magnetic tapes. The jacket is a tough polymer. (You cannot remove the disk from its jacket.)

Blank disks come in several varieties. The most common is single-sided (SS) single-density (SD). They also come in SS double-density (DD) and double-sided (DS), SD and DD.

It's not a well-known fact, but: all disks, from any manufacturer, are made by the same process. They're graded in testing—only those that pass the most rigorous tests get to be DSDD disks. This means that all SD disks are coated on the reverse side, but the coating isn't guaranteed to hold data. Nevertheless, just by using a hole punch to notch the back side of disks, you can double their capacity.

There are special tools to do this, but it's easy to do with a simple single-hole punch.

Take two disks and remove the stickers (if any) that cover the notch on the disks' edges. Place the two next to each other on a flat, clean surface. Now, flip the right disk over onto the left, as if you were turning the pages of a book. Each disk's notch now provides a template for a second notch. Once you make that second notch, you'll be able to use the back side of the disk.

Some drive mechanisms (Rana, Astra, and Percom) use the timing hole (close to the disk's center) in formatting. With these, you must also punch a second timing hole, opposite the first.

A certain amount of controversy exists over using the flip side of single-sided disks in single-sided disk drives. Some say that reversing the disk's direction of rotation, which is what happens when you use the back side, causes dust trapped in the disk's inner lining to be loosened and to fall into the drive's mechanism. However, most computerists today flip their disks for a substantial savings with little or no consequence.

CARE OF DISKETTES

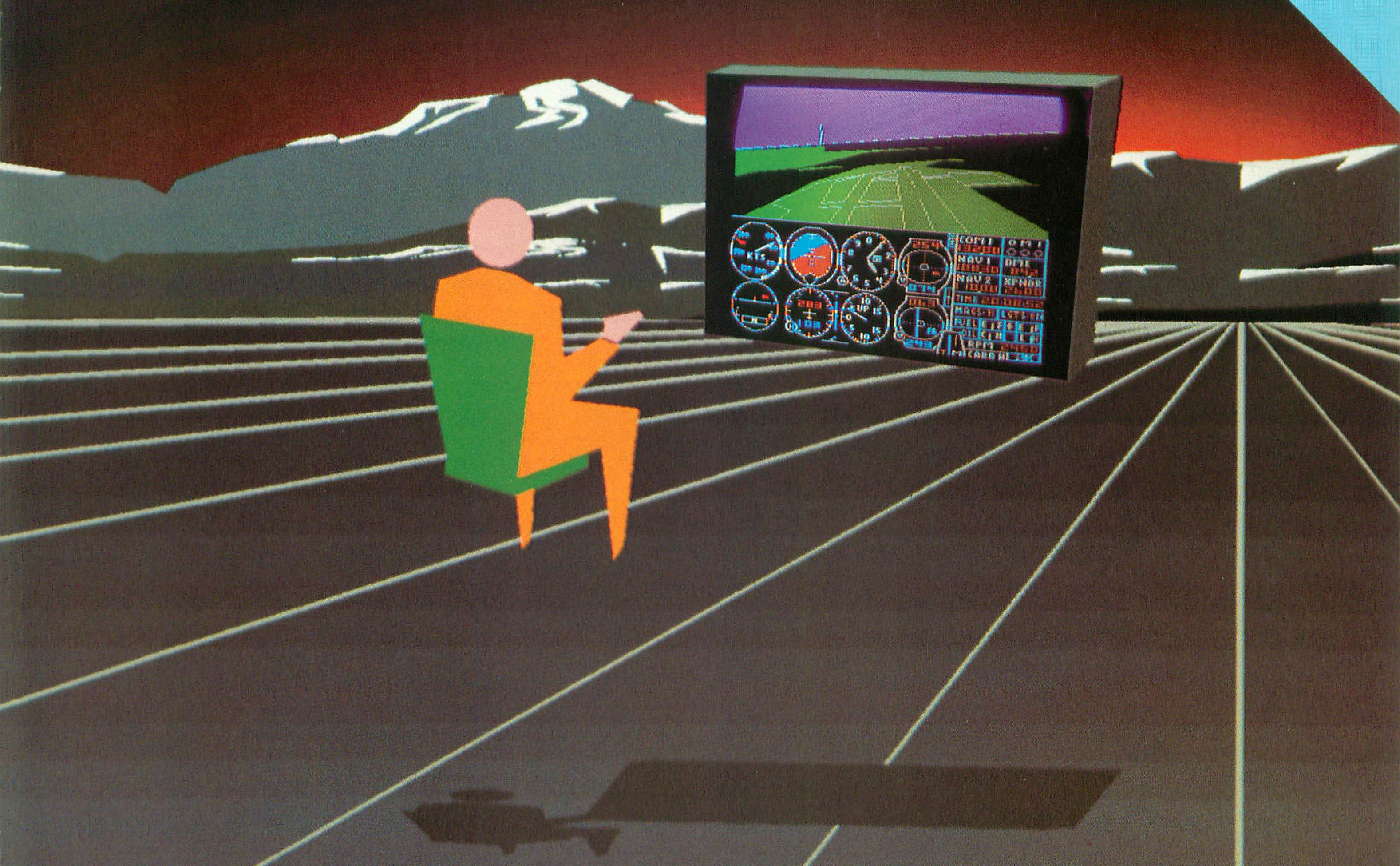
The back side of a disk envelope will give you most important information about disk care and handling. But, briefly:

Keep disks as far as possible from dirt, dust, smoke, liquids, magnetic fields, very small children, and animals.

Don't bend them, and don't subject them to extreme temperature or pressure.

Keep disks in their paper envelopes when not in use.

Never touch the actual disk surface, visible through the oval window in the disk jacket. If you follow these simple rules you'll have little or no difficulty with your drives or diskettes.




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